

Coal Age

APRIL, 1953

A MCGRAW-HILL PUBLICATION—PRICE 50c

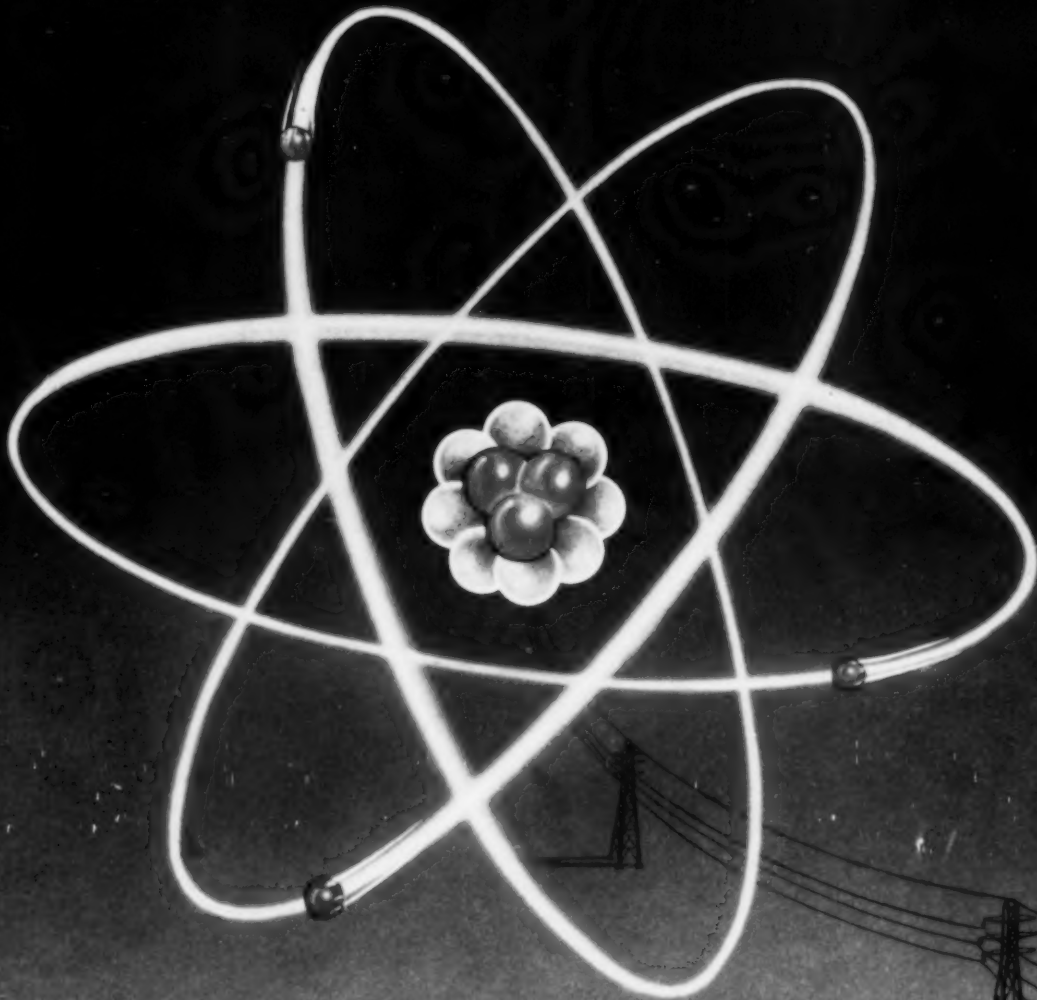
Cutting Tire Cost

Can you control your tire cost? Here's Shen-Penn's way — in protecting a tire stake of almost \$1 million. p 76

Heated Screens Pay

New units recover fines, up plant efficiency and save screen-change time. p 98

Full Contents on p 5



Power From The Atom...
Soon... Later... Never? ... P 70

OPERATORS GET A DAILY 'BONUS TRIP'



with **DROP BOTTOM MINE CARS**

The unloading speed of Q.C.F. Drop Bottom Mine Cars means an extra round trip every day. How many extra tons could this mean to you? As each car passes over the unloading point, it unloads itself automatically. Then the doors close and latch—also automatically! In less than 2 minutes, the trip has unloaded and is on its way back to the face. In addition, the fast automatic dumping of Q.C.F. Drop Bottom Mine Cars keeps storage hoppers filled to provide continuous operation of your preparation plant. Simple! Speedy! Yet, the time saved means extra tonnage—every day. Your nearby Q.C.F. Representative has all the facts and figures on Drop Bottom Mine Cars. American Car and Foundry Company, New York • Chicago • St. Louis • Cleveland • Washington • Philadelphia • San Francisco • Huntington, W. Va. • Berwick, Pa.

Q.C.F.
MINE CARS



for Constant Haulage

RESEARCH KEEPS

B.F. Goodrich

FIRST IN RUBBER



Longer belt life, less spillage with B. F. Goodrich cord belt

MOST conveyor belts trough well under full loads. But what happens when they carry just a partial load? Without the weight of heavy material, these belts can't maintain complete contact with the idlers. There's nothing to keep them centered. Belt damage is the result.

The B. F. Goodrich Caricoal cord belt eliminates this cause of premature belt failure. In this exclusive design, there's a ply of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together. There being no crossweave in the cord plies, the cord belt is more flexible,

and so troughs perfectly whether empty, lightly, or fully loaded. Spillage is reduced, belt keeps centered on idlers, sustains less damage, requires less maintenance.

The belt in the picture carries 350 tons of run-of-mine coal a day, but the rate of loading varies, so belt flexibility is important. That's why the mine owner selected a B. F. Goodrich cord belt.

Natural troughing is just one of the reasons Caricoal cord belts last longer, serve better. Other construction features provide high impact resistance, and double protection against mildew. Let a BFG distributor show you how these longer-lasting conveyor belts can

cut your coal handling costs. Use the coupon below.

The B. F. Goodrich Company
Dept. M11, Akron, Ohio

Please have your nearest distributor talk to us about Caricoal conveyor belts.

Name

Title

Company

Address

City State

Caricoal Conveyor Belts
B.F. Goodrich

There's a **BETTER**



Once upon a time the old stereoptican slides were the last word in parlor entertainment (with the lamp turned up). But science tells us we do it better today, with the lights turned low and the television bringing us romance, wrestlers or Michael Angelo at the turn of a dial. We admire science, so we'll take their word it's progress.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

PHILADELPHIA, PA.

way to do it today!

AND THAT ALSO GOES FOR
LUBRICATION...

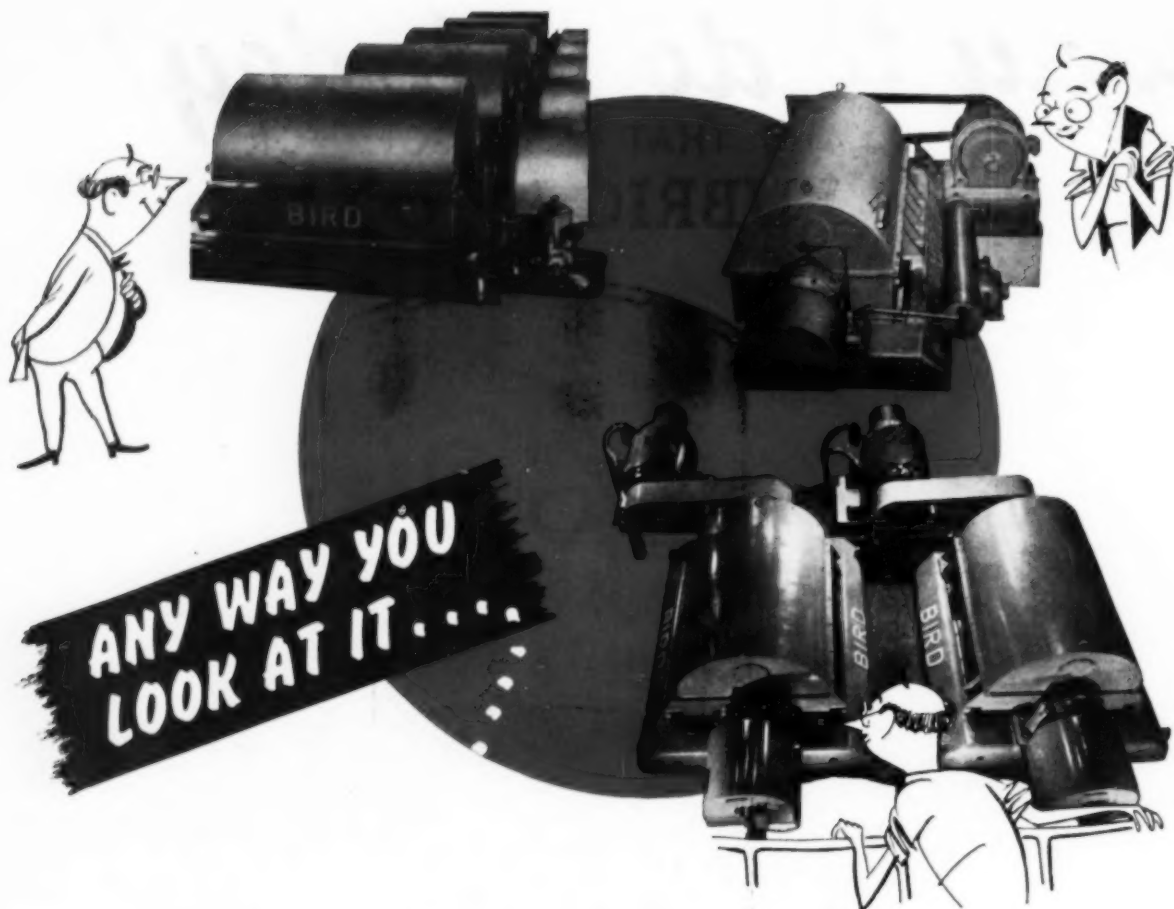
DO IT
BEST
WITH



Hulburt *Quality*
GREASE

You may have your doubts about the benefits of television. But in lubricating coal mining machinery, there's no doubt there's a better way to do it today—and that's with Hulburt Quality Grease. That fact has been proved by many years of actual down-

in-the-mine experience, with Hulbert Grease effecting substantial reductions in machinery operating and maintenance costs. Sponsor HULBURT GREASE in your mine, and tune in on a program of better machinery performance.



**ANY WAY YOU
LOOK AT IT...**

THE BIRD COAL FILTER

IS THE ONE BEST WAY TO DEWATER FINE COAL

CAPACITY?

The largest size of Bird Coal Filter handles a ton or more of $\frac{1}{4} \times 0$ coal a minute. Feed slurries may contain as little as 30% coal or even less, and 20% or more minus 200 mesh.

QUALITY?

The Bird Coal Filter rids your fine coal of those undesirable, high ash slimes

that retain moisture and reduce the quality of the finished product.

LOW COST?

The Bird Coal Filter does the job for less than seven cents per ton including power, labor, amortization, maintenance — everything. You get maximum fine coal recovery without the bother and expense of screens, sludge tanks or other auxiliary dewatering equipment.

Ask us to show you exactly what the Bird Coal Filter can do for your preparation plant.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS



THIS MONTH'S COVER

OUR ARTIST'S CONCEPTION of what an atom looks like—greatly simplified—keynotes the lead-off feature "Power from the Atom" (p 70). You'll see plenty in the papers from now on about the use of atomic energy for electric power . . . and we thought every *Coal Age* reader would be interested in a factual up-to-the-minute analysis of the problems and possibilities as seen by the various authorities. Incidentally, if, like we ordinary mortals, you get a mite confused when the scientists discourse on how they harness an atom, you'll really enjoy this readable, simplified explanation of how atomic energy works.

LOOK FOR MAY COAL AGE EARLIER THAN USUAL

Next month's issue is being printed a week earlier than usual so that you'll have a chance to study the special advance report on the AMC Coal Show and Exposition before going to Cleveland. As in past years, *Coal Age* will bring you a preview of the technical discussions and manufacturers' exhibits. We suggest you make a point of seeing this special report before you take off.

EFFICIENCY: MACHINE-MADE

How in a span of 10 yr the bituminous industry, by increased use of machines, has raised tons per man sufficiently to enable it to sell coal at a price \$1 a ton less than it would have been able to without such investment in new equipment and methods will be analyzed in the lead-off article in the May issue. What has been done since 1942, how it has been done, and what the prospects are for additional increases through better use of machines are among the subjects covered in this practical discussion. And as every month, this issue also will bring you a full complement of mine-operating articles dealing with deep and strip mining, preparation, safety and maintenance.

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VOLUME 58 NUMBER 4

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INSIDE- OUTSIDE PROTECTION

TUNE IN:
Tuesday nights
on television —
the **TEXACO STAR THEATER**
starring **MILTON BERLE**.
—
See newspaper for
time and station.



TEXACO



... to keep your wire rope **STRONG LONGER**

TEXACO CRATER is famous for its *quick* and *thorough* penetration. It goes right to the core of the rope, coating the outside metal strands with a tough, long-lasting lubricating film that defies wear and rust. This film also surrounds the hemp core, preserving its original oiliness and adding greatly to its life. Even under the most adverse conditions, *Texaco Crater* keeps wire rope strong longer, brings down maintenance costs.

Another widespread use for *Texaco Crater* is on open gears. Here, it clings to the gear teeth, cushioning shocks and heavy loads. *Texaco Crater* does not channel or throw off. Gears run more quietly, wear is negligible.

For added convenience in application, use *Texaco Crater X Fluid*. It goes on as a liquid (*without heating!*) and stays on just like the regular *Crater*.

In hydraulic mechanisms, use *Texaco Regal Oil (R&O)*. Tests prove it has more than ten times the oxidation-resistance of ordinary turbine-quality oils. Keeps sludge, rust and foam out of systems.

Let a Texaco Lubrication Engineer survey your equipment and recommend the effective lubrication that will improve performance and reduce costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

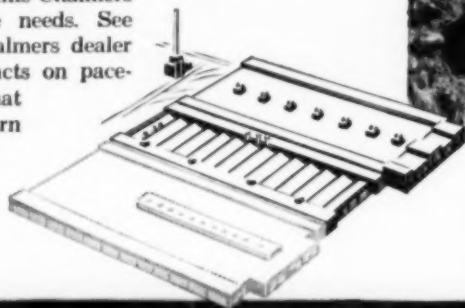
There's more to tractors than meets the eye . . .

The real "pay-off" value of any tractor to its owner is how it measures up to the standards set by today's modern production methods.

To meet these needs, Allis-Chalmers started from scratch and built a *line of tractors with a future*. Thousands now have been tested and proved on the toughest proving ground of them all, actual jobs, and they have more than measured up to expectations. Owners have found that these tractors set new standards of performance . . . that they give greater output with less down time . . . plus more profit, whether pulling, pushing, digging or dozing. Operators have discovered new ease and comfort in operation, too; and mechanics say these are the easiest-to-service tractors that they have ever worked on.

Yes, the "family circle" of users of Allis-Chalmers tractors is growing constantly. Many users who bought their first Allis-Chalmers tractor only a few years ago now have fleets of them, and many others who operate only one or two tractors have become Allis-Chalmers boosters.

This acceptance is the springboard behind a big plant expansion at Springfield, Illinois, which will enable Allis-Chalmers to meet *your* future needs. See your nearby Allis-Chalmers dealer now for the inside facts on pace-setting tractors that measure up to modern production methods.

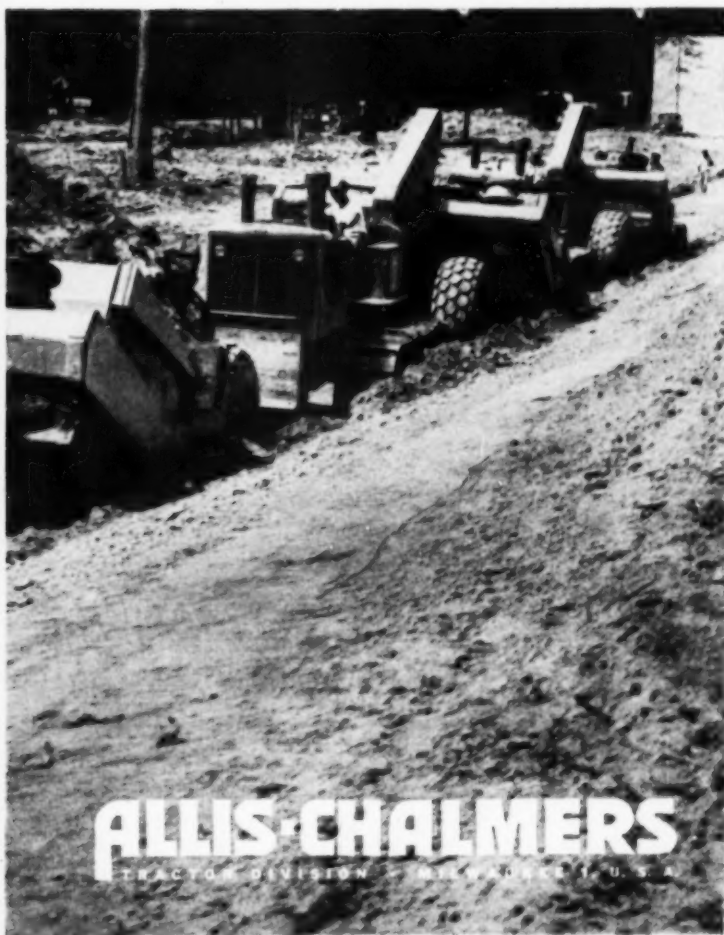




▲ For stripping overburden, hillside seams, cleaning pit bottoms, building access roads . . . wherever big production is essential to the job, this big HD-15 has more than proved its worth. With 109 drawbar hp. and 27,850-lb. weight, it works quickly, efficiently as a dozer, tractor-shovel, puller or pusher.



▲ This 72 drawbar hp., 18,800-lb. HD-9 is making friends in every field because its power and weight make it an ideal size for dozens of today's modern jobs. In addition, operators can gain up to 25 percent more production on short dozing jobs because they can go from any forward speed to any reverse speed with just one shift.



▲ The 40-drawbar hp., 11,250-lb. HD-5 is a versatile jack of all jobs above or below ground. With hydraulically controlled Tracto-Shovel, it's equally useful handling ore and coal, cleaning up around conveyors and hoppers, loading hauling units, dozens of other jobs.

▲ Here's real tractor teamwork . . . four HD-20's in a "train" — three pulling scrapers, one pushing — all working together for big production. With torque converter drive, they synchronize speeds at contact . . . automatically load at the fastest speed that job conditions permit, with less strain on operators and equipment. With 175 engine hp. and 41,000 lb. weight, the HD-20 is today's new yardstick of crawler tractor performance.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE, U.S.A.

"Toughest operating but the first batch of

**Says Chief Electrician, Hudson Plant,
Universal Atlas Cement Company**

● Year after year, at this quarry, the Amerclad is exposed to knife-sharp fragments of flying rock. During the summer, the rock often gets so hot that you can't even touch it. Other times, the cable lies out in the rain and snow—often at sub-zero temperatures.

At the Hudson, N. Y. quarry of Universal Atlas, Chief Electrician Frank Rodmond said, "This Amerclad runs the constant danger of being hit with flying rock fragments through secondary blasting. Yet the down-time cost of this operation is so high that we just can't stand cables that keep failing. We kept that last batch of Amerclad 12 years before we replaced it, yet it was still serviceable when we switched over to new Amerclad."

If you want service like this, specify Amerclad the next time you need cable that can really take it. Amerclad is available in a great many sizes and constructions, with or without shielding. There is a type to power anything from a river dredge or mine locomotive down to a rough and tumble electric hand drill. *Send the coupon*, and get more information.

AMERICAN STEEL & WIRE DIVISION
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THIS IS A TYPICAL DRILL. It uses a 4-conductor No. 8 Amerclad cable.

A STANDARD Cable for

- ▶ paper & varnished cambric cable
- ▶ asbestos wire and cable
- ▶ aerial, underground & submarine cable
- ▶ shovel & dredge cable

U·S·S AMERICAN ELECTRICAL

condition in our quarry— Amerclad lasted 12 years”



NOTICE THE CABLE TRAY fastened to the shovel. This was developed by Universal Atlas for easier cable handling—it also prolongs life of the cable.



HERE A CABLE is raised on horses to clear the railroad track. It feeds the shovel visible in background.



TWO WORKMEN WATCH from blast shelter as charge is set off in distance. Low horses cushion cable from shock of falling rock in secondary blast areas.

every ***SPECIAL Job!***

- ▶ mold cured portable cord
- ▶ machine tool & building wire
- ▶ special purpose wire & cable

WIRE & CABLE

UNITED STATES STEEL

SEND THE COUPON

American Steel & Wire Division
Room FE-43, Rockefeller Building
Cleveland 13, Ohio

- ☐ Please give me more information about Amerclad.
- ☐ I'd like to talk to your representative.

Name

Firm



Address

City State



Strips, Clears, Pulls scoop

says veteran Illinois dirtmover about Tournadozer

After 18 years of coal mine stripping and other dirtmoving, Ivan Wright, Peoria, bought his first rubber-tired Tournadozer last year. Now, with more than 2500 hours on this 19 m.p.h. rig, he says, "There's not a crawler-type machine made that will move the amount of dirt Tournadozer will!" For example:

Stripping — On job pictured here, Tournadozer, working alone, stripped 40 ft. of overburden at a small coal mine near Glasford, Illinois. Tournadozer removed all slate and refuse including 1 foot of tough cap rock so that coal had only to be shot and hauled out.

Clearing — Wright assigned 2 dozers to clearing brush and trimming banks for a road. He put a Tournadozer in one ditch and a crawler in another. "Tournadozer walked away from the crawler," he says. "Never

found a tree the Tournadozer couldn't take out . . . takes a tree up to a foot in diameter in one pass."

Pulling a scoop — On typical earthmoving, Wright's Tournadozer pulling a 15-yd. scraper averaged 15 trips (150 pay yds.) of heavy clay hourly on 400' cycles, according to time studies made by a Government Engineer. "Working with a scoop," says Wright, "you can load in 2nd gear and dump in 3rd . . . can double production of a crawler-pulled scraper. Tournadozer is the best rig to pull a scoop that I've ever seen or used." Rig has 186 h.p. with 4-wheel drive.

Dozing up steep grades — "Working in 6 to 7'-deep channel," reports Wright, "Tournadozer would come up 3-to-1 slopes with a load whereas crawler *could not* make the slopes with a load." (Tournadozer's constant-mesh transmission lets you change speed under load without loss of vital momentum . . . 186 h.p. and 4-wheel drive give you plenty of power to work up steep, slippery grades.)

TWICE AS FAST ON 85% OF YOUR DOZING WORK





faster...

Removing overburden at mine near Glasford, Tournadozer, working alone, strips 40 ft. of clay, sand, shale and soapstone, moving overburden on average of 200 ft. One foot of cap rock just above coal seam was also removed by Tournadozer, leaving coal ready to shoot and haul out.

After 2500 hours, Tournadozer tires still have about 85% of original tread. During this period, the rig has been 95% mechanically efficient.

Job-to-job moves — In 2500 hours of scattered assignments, Tournadozer has never been on a trailer . . . travels any time, anywhere over main roads, under its own power, at speeds to 19 m.p.h. "Up to 50 miles, you can move Tournadozer as fast as you can a crawler with a truck," says Wright. You waste no time loading, blocking . . . save time shuttling between assignments or traveling to neighboring spreads.

Ease of operation — Comparing Tournadozer with crawler rigs, Wright reports, "Tournadozer is much easier to operate—no work to it." No wasted time or effort clutching . . . Tournadozer changes speed *instantly* with movement of speed selector switch. Big 18.00 x 25 low-pressure tires take up many of the shocks of uneven ground . . . save wear and tear on operator as well as machine.

Be your own judge of what Tournadozer can earn on your operations. To help you make estimates, ask your LeTourneau Distributor for owner-verified field reports covering all types of working conditions . . . or have him demonstrate one of these high-speed rigs in your pit. Meanwhile, write direct for bulletin TD-117 describing design and construction.

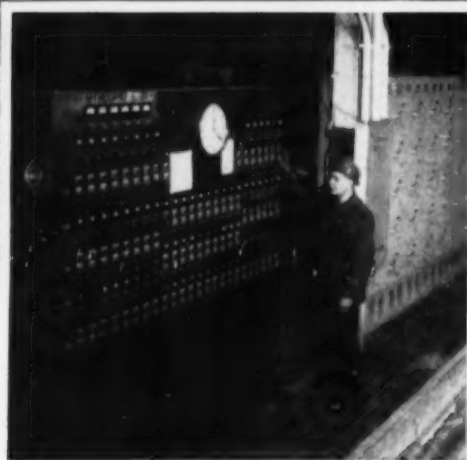
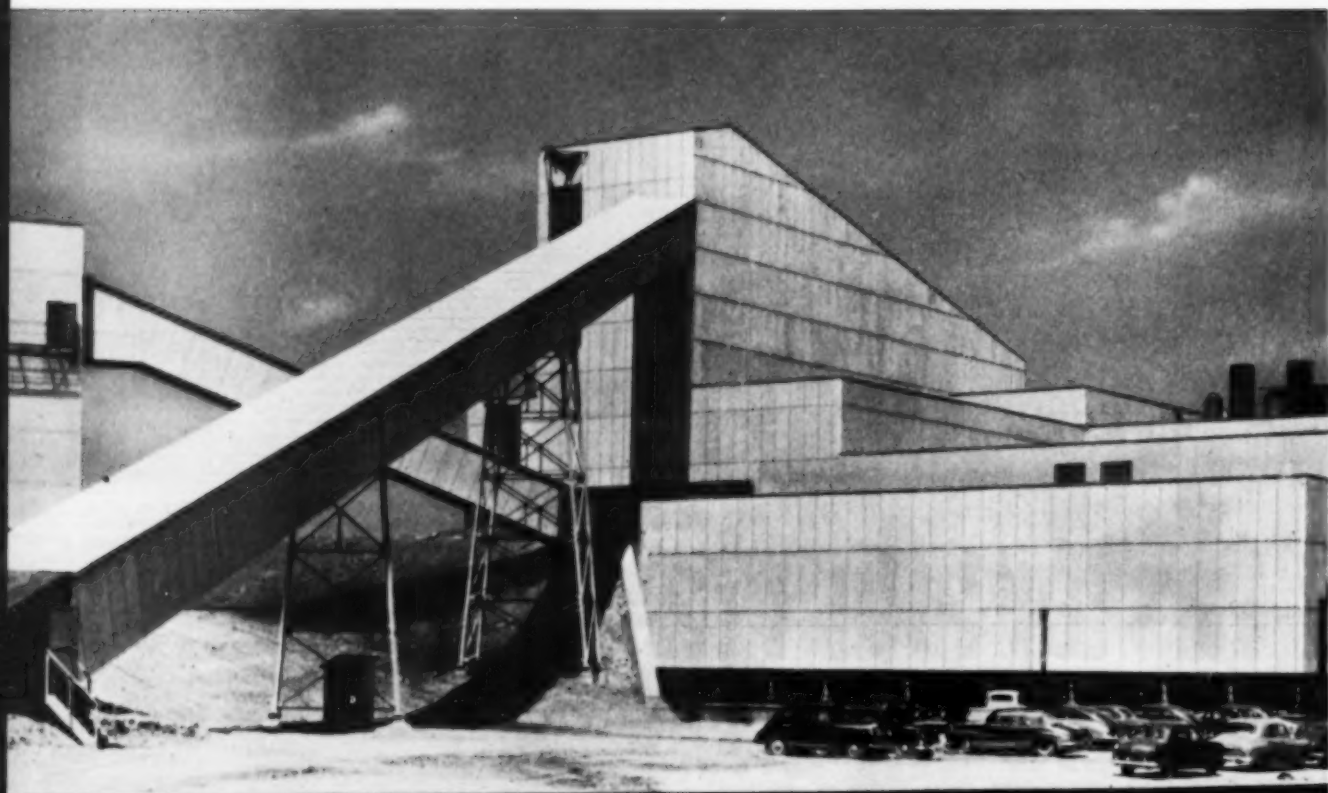
Tournadozer—Trademark Reg. U.S. Pat. Off. D-145-CA



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PEORIA, ILLINOIS

TOURNADOZERS

**They did what you can do
to produce more**



Just one man can start or stop a whole operation from this modern centralized control station. Individual Westinghouse motor starters are grouped in clean, compact, spacesaving cabinets to the right of the control station.



Westinghouse Life-Line Motors, driving these Deister tables, never need greasing because they have pre-lubricated sealed bearings. Grease can't get out and dirt can't get in. Once they're installed you can forget about them.

How Planned Power helps clean 1500 tons of coal per hour

At Hanna Coal Company's Georgetown Preparation Plant, modern methods of automatic control and efficient power distribution are used to speed up production and reduce costs. One result is that only five men are required to control the entire plant which cleans 1,500 tons of raw coal per hour.

Plant practically runs itself

Automatic, centralized control makes it possible for just one man to start or stop a whole operation from one central point. Centralized control also conserves valuable plant space and makes it easy to inspect and service controls.

No chance for conveyor pile-ups

The conveyers that carry coal all over the plant are specially interlocked to prevent pile-ups. If a stoppage occurs on one conveyor section, all those behind it will automatically stop.

Only three kwhr per ton of coal

Seven Westinghouse power centers deliver electric power to different operations efficiently and at the proper voltage. These, combined with highly efficient Westinghouse motors and gearmotors, contribute to the most economic utilization of power.

Loads a carload of coal every two minutes

Another feature of this Westinghouse-equipped plant is in loading and weighing. One man loads five railroad cars at the same time, and on the average of a full car every two minutes. After loading, the cars are automatically weighed with the help of three electric eyes.

Call Westinghouse early on your next project

Westinghouse, the electrical manufacturer with the widest cleaning plant experience, can help you get benefits like these in your next project. Be sure to call us early in the planning state. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-94923



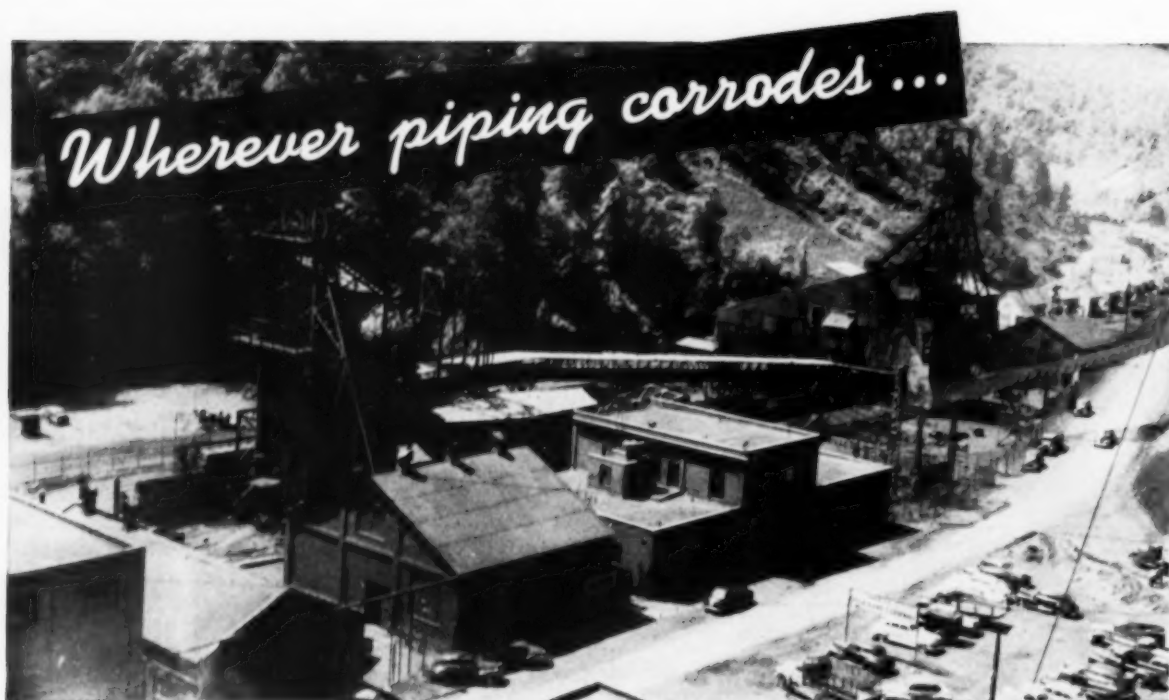
The new Georgetown Preparation Plant. The Hanna Coal Company, the Cleaning Plant Builder and Westinghouse engineers worked together in developing this highly productive operation that emphasizes automatic control with a minimum of man power.

YOU CAN BE SURE...IF IT'S

Westinghouse

EQUIPMENT FOR MINING





use **YOLOY** continuous weld pipe

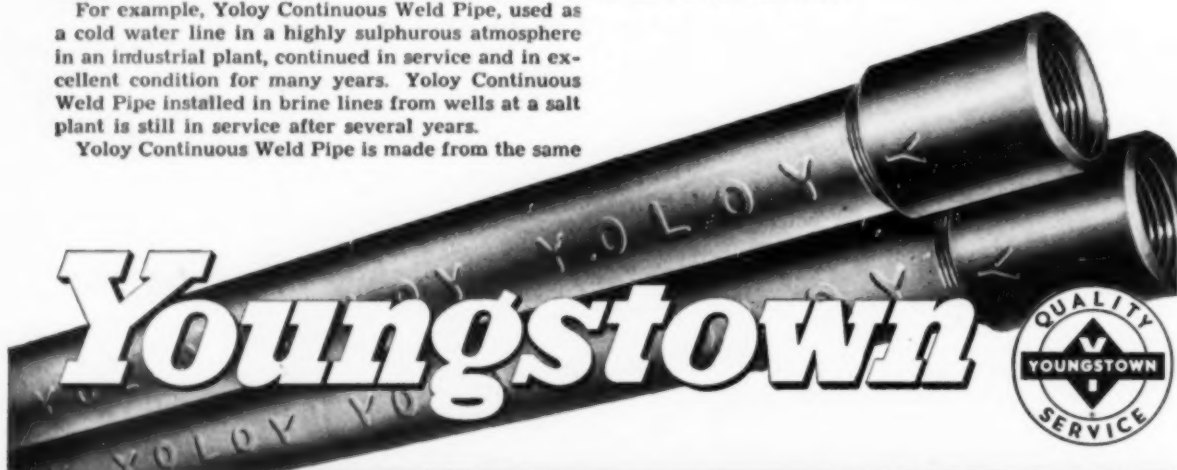
Yoloy Continuous Weld Pipe offers distinct advantages for use in mines and industry where replacements due to corrosion are frequent. In addition, its use is recommended wherever piping is concealed—in commercial buildings, schools and residences.

In standard tests Yoloy steel has demonstrated that its resistance to atmospheric corrosion is four to six times greater than that of regular steels. In actual installations Yoloy Pipe has demonstrated that it has a high resistance to many other corrosive conditions.

For example, Yoloy Continuous Weld Pipe, used as a cold water line in a highly sulphurous atmosphere in an industrial plant, continued in service and in excellent condition for many years. Yoloy Continuous Weld Pipe installed in brine lines from wells at a salt plant is still in service after several years.

Yoloy Continuous Weld Pipe is made from the same

nickel-copper steel composition that has proved so successful in service in the oil, mining, railroad, chemical, trucking and other industries where resistance to corrosion and abrasion is of prime importance. This pipe is easy to thread and fabricate with standard pipe tools. It can be electric or gas welded readily. It has high strength and high resistance to abrasion, shock and vibration fatigue. For further information, write or phone the Youngstown District Sales Office nearest you.



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Manufacturers of Carbon, Alloy and Yoloy Steel

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES

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for lower **first** and **last** costs

power with this tough cable

ANACONDA

BUTYL-INSULATED HIGH-VOLTAGE CABLE

—easier to install—lasts longer

—handles better

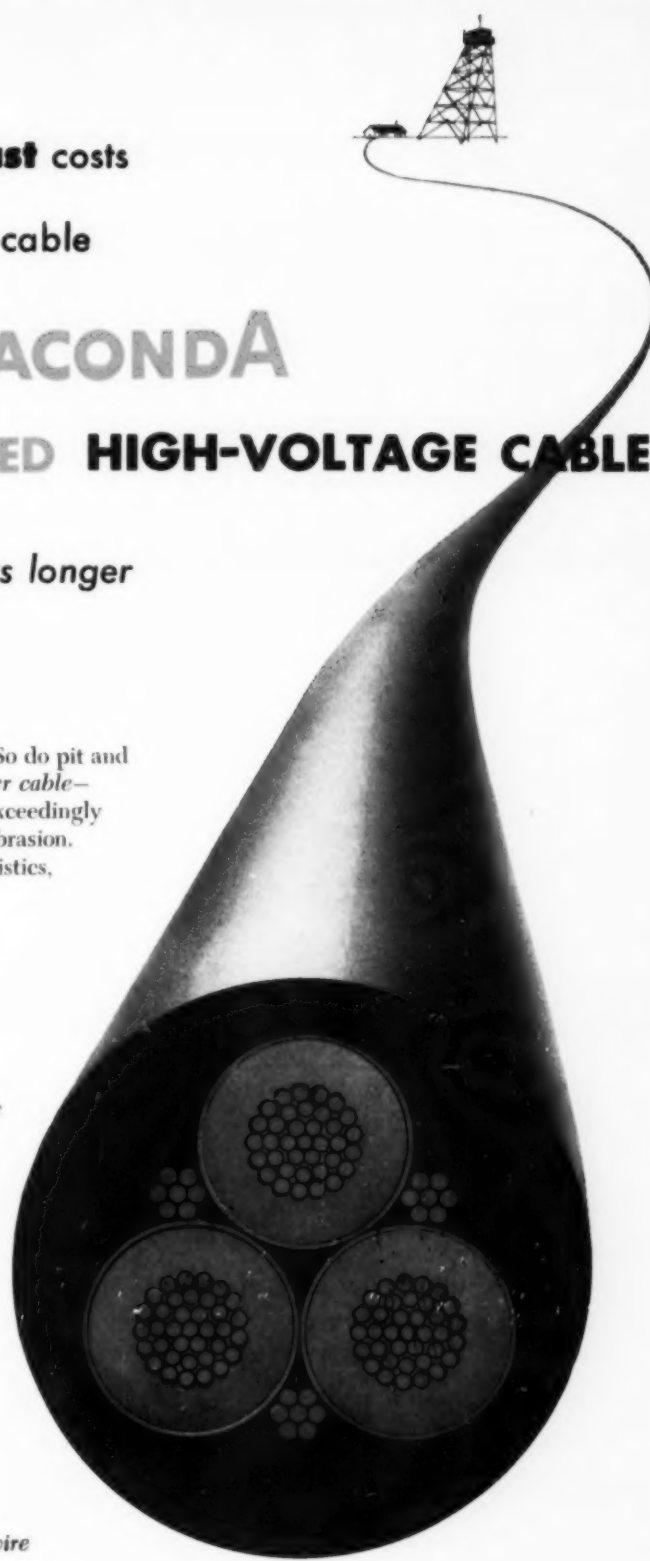
Mine after mine comes up with the same answer. So do pit and quarry operators. *It pays to use this modern power cable—ANACONDA Type AB*, for uses up to 15 kv. It is exceedingly hard to damage by impact, crushing, twisting or abrasion. Butyl insulation has superior long-aging characteristics, improved resistance to moisture, ozone, heat. Neoprene jacket—as tough as they come—has real flexibility and great strength. This cable handles well and lasts longer in all weather. It has high dielectric strength, affords excellent protection against acids, oils, and even flame.*

Our mine specialists will gladly show you a sample of this safety cable. And they can also show you just the right cable for your shovels, drills, shuttle cars, and the new continuous mining machines. See how recent improvements have made famous ANACONDA Securityflex* portable cables even better. Call your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Trademark 32356

- butyl insulation
- neoprene jacket
- copper tape shielding
- color coding
- stranded copper ground wire

the right cable for the job **ANACONDA**[®] wire and cable





Here's how ROCKMASTER® reduces noise



the inside story

The noise your neighbors hear . . . and complain about . . . is air blast. It is the noise of wasted explosive energy that escapes into the air before it has done its job on the burden. Such noise is difficult to avoid when holes are spaced too closely and detonation begins at the top. This waste of power occurs because the explosives force seeks the path of least resistance.

By allowing initiation at the bottom of the holes, the ROCKMASTER Blasting System can keep the explosives force under prolonged confinement . . . as shown in the above photos taken at the height of four different ROCKMASTER blasts. Each photo shows considerable movement of burden with practically no escaping gases.

To see how the ROCKMASTER Blasting System can improve your blasting efficiency and reduce noise at the same time, send for your copy of the booklet, "Overburden Blasting Techniques."



The North Jersey Quarry Company erected this greenhouse at its Millington operation, 400 feet from the working face, to prove that its blasts don't break windows. The reduced noise and vibration of the ROCKMASTER system helps them improve community relations.



ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

LOADING IN LOW COAL CAN BE PROFITABLE

When You Put the **Goodman Type 865 Loader** on The Job



20475

IT'S LOW

Over-all height is only 26½",
coal line height 17½".

IT HAS SIDE SWING-MOTION

Both loading head and discharge end swing 40° to either side for wide face room work with minimum maneuvering and for pillar recovery without loss of time or tonnage.

IT HAS VERTICAL SWING-MOTION

Both loading head and discharge end can be raised or lowered to suit loading conditions . . . to suit transportation equipment.

IT HAS CAPACITY

8-tons per minute in free loading coal.

IT'S FAST

With at least one of the gathering arms always under the coal, loading is continuous; machine is not subject to strain or shock.

IT HAS POWER

Two 10 hp. motors for tramming and hydraulic pumps; two 20 hp. motors for gathering and conveying.

IT'S SAFE AND EASY TO OPERATE

Smooth, positive movements through full hydraulic control; operator can always be under supported top and away from rib.

IT'S RUGGED

All parts feature strength and precision construction for long life; maintenance cost is low.

ASK FOR A COPY OF DESCRIPTIVE CATALOG CLT-521

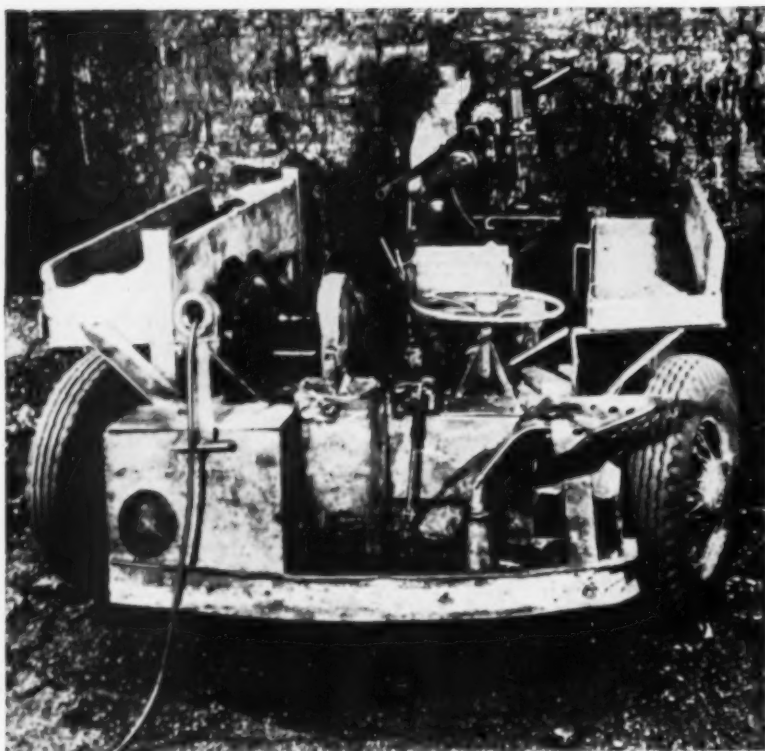
OTHER GOODMAN SWING-MOTION LOADERS:

Type 665 Type 666 Type 660
Over-all ht. 43" Over-all ht. 36½" Over-all ht. 33"

The Type 865 Loader and other new Goodman mining machinery will be shown at the Cleveland Coal Show May 11-14. You are cordially invited to make a first-hand inspection.

Goodman
MANUFACTURING COMPANY
4834 S. Halsted Street • Chicago 9, Illinois

Cutting Machines Conveyors Loaders Shuttle Cars Locomotives Continuous Miners



Use G-E GEOPRENE PORTABLE CABLE for the really tough jobs!

Built for the really tough jobs, G-E Geoprene portable cable is specifically recommended for use as trailing cable for cutters, loaders, and other portable mine equipment.

Its abrasion-resistant neoprene-base jacket is resistant to most oils, acids, alkalis, sunlight, and flame. For additional strength, a tough corded reinforcing mesh increases the cable's ability to withstand continual hauling and dragging, while the conductors themselves are rope-stranded for maximum flexibility.

In the full line of General Electric wires and cables you will find exactly the cable you need. This line includes G-E No. 1799 varnished-cambric-insulated cable, Super Coronol® cable, wire armored cable for borehole service, interlocked armor cable, aerial cable, mine telephone cable, Flamenol® control cable, and magnet wire.

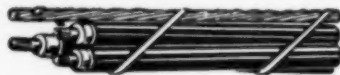
*Registered Trade-mark General Electric Company

You can put your confidence in—

GENERAL  ELECTRIC



WIRE AND CABLE IDEAS for Coal Mining



G-E Super Coronol preassembled aerial cable has many advantages over ordinary power cable. No field assembly is necessary . . . insulated conductors, binding strip, and messenger are completely assembled at the factory. Cable requires only a minimum clearance of right-of-way and can be quickly installed. Maintenance cost is low.



For the winding of motors, lifting-magnets, brake-coils, generators and starters, General Electric offers two types of magnet wire. For temperatures to 105 C, specify Formex®, Class A, an exceedingly flexible, tough, abrasion-resistant wire. Specify Deltabeston®, Class B, insulated with glass or asbestos, for temperatures to 125 C; Class H, with silicone-varnish impregnation, for temperatures to 180 C.



G-E shot firing cord is reliable and economical. Sturdy, flexible, highly resistant to moisture and mechanical injury, it has a red rubber jacket for easy identification.



The wide line of G-E wires and cables for the Mining Industry is described, with valuable application data, in this 24-page illustrated booklet. For your copy write to Section W70-414, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.



The RBD-15 HYDRAULIC ROOF-BOLTING DRILL

Compact... Handy... Highly Maneuverable

Now Doubly Flexible with 2-SPEED ROTATION CONTROL

Your roof-bolters will use the new Joy RBD-15's top rotation speed for maximum hole footage under good drilling conditions—then change to the lower speed with its doubled torque to tighten the nuts. The lower speed and higher torque are also ideal for use in hard drilling conditions.

The change is made instantaneously and at will—there is no time lost, nothing to adjust. Merely the touch of a hydraulic control valve accomplishes the shift, reducing the chuck speed from 625 to 312 rpm and increasing the rotating torque from 120 to 240 ft. lbs. The combination of increased torque and high thrust is ideal for cutting the harder rocks—and the feed pressure of the RBD-15 is adjustable up to 4000 lbs. (nearly double that of the RBD-10). Another feature: a dual-cylinder hydraulic drop leg, which gives a firm support while drilling.

GETS IN ANYWHERE

The RBD-15 is a self-propelled, hydraulically operated, rotary roof-bolting drill, close-coupled and compact. It's expressly designed for extreme maneuverability and adapted to tight quarters... has individually

controlled pairs of wheels on each side to give it the turning, handling and steering qualities of a crawler-mounted unit. The RBD-15's combination of 150° boom swing and 180° roll, with 60° drill tilt and 180° swivel, assures drilling holes in any direction. In most cases, it will drill to the desired depth with one steel change or less.

● Check with us for the roof-bolting equipment, rotary or pneumatic, that will give the best results under your conditions. **Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

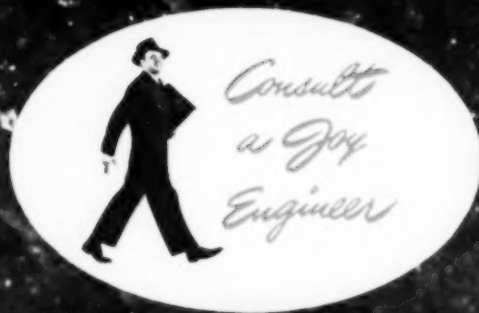


*Consult
a Joy
Engineer*

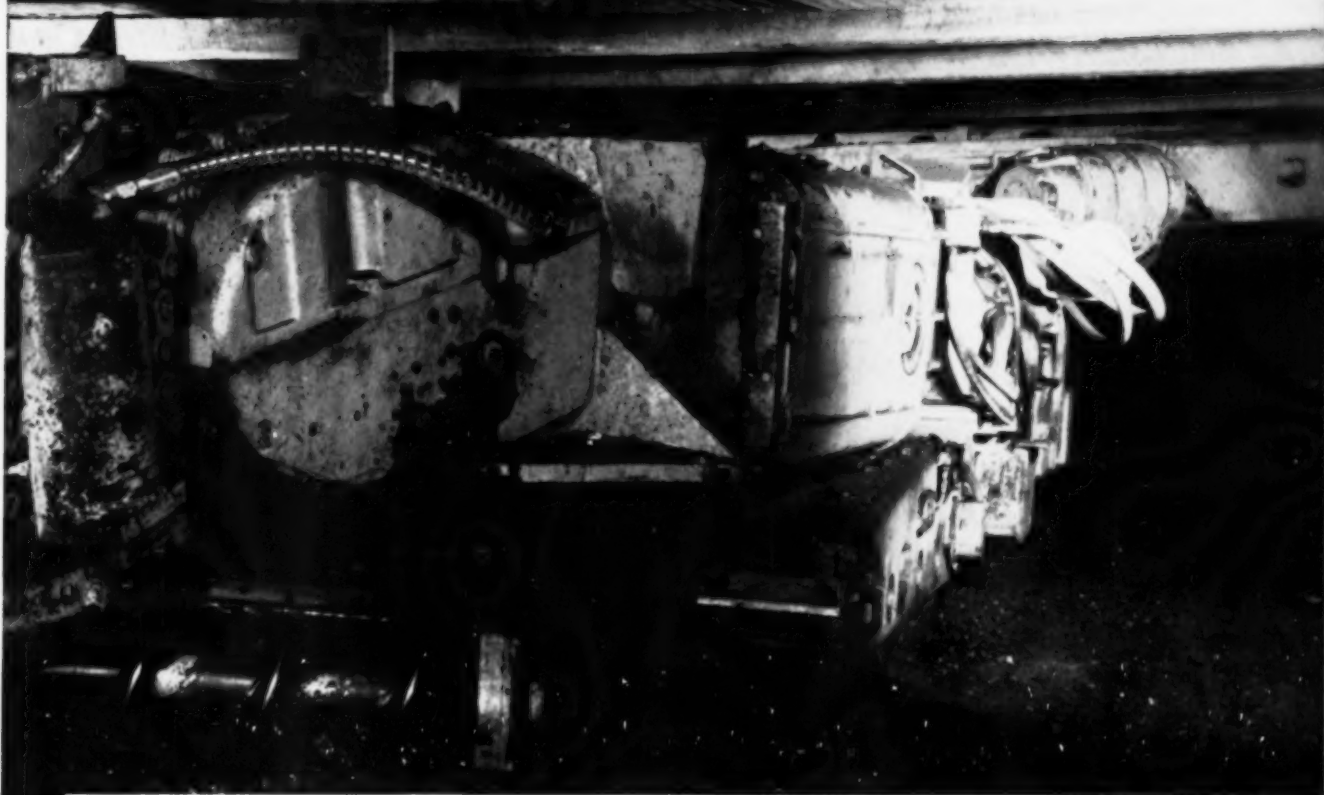
JOY

**WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT**

"Man, that's the Business End"



of the Lowest-Cost Mining Method there is!"




Depend on the CONTINUOUS MINER

- Low coal, thick seams or split seams . . . it makes no difference what your mining conditions are, there is a field-proved JCM machine built to suit them. *More than 200 in service or on order!*
- The Continuous Miner does everything you ask of it . . . develops entries, opens headings, drives up rooms, takes pillars.
- Gives you maximum recovery . . . over 80% total recovery is common, and some cases actually exceed 90%.
- Gives you favorable size consist and high production rates, at absolute rock-bottom cost per ton mined. Let us show you complete facts and figures.

Address Joy Manufacturing Company, Oliver Building,
Pittsburgh 22, Pa. In Canada: Joy Manufacturing
Company (Canada) Limited, Galt, Ontario.

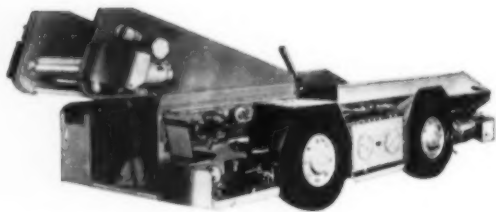
JOY

**WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT**



Meet the Champ- 1953 Model The 10-SC!

**It's the fastest round-trip SHUTTLE CAR
built for high-production mining today.**



The improved Joy 10-SC Shuttle Car is available as a Permissible or Non-Permissible unit, for net payload capacities up to 10 tons. It is built in 43", 48" or 54" heights (machine only) and may be equipped with 4", 6" or 8" sideboards. Trimming speed loaded is approximately $4\frac{1}{2}$ m.p.h., and the unit is equipped with Joy-pioneered hydraulic cable reel, and hydraulically adjustable elevating discharge. Other special features include: 4-wheel drive, 4-wheel positive steering (hydraulic "power" type) and 4-wheel disc-type brakes, unaffected by dirt, coal dust, oil or water . . . improved arrangement of operator's controls . . . new "zone"-type lubrication . . . dependable Joy "Magnetax" controls, etc.

The Joy 10-SC Shuttle Car is famous for dependable, high-tonnage hauling under the toughest conditions, such as handling full loads of coal or rock in split-seam mining, etc. But we've improved it! The 1953-model 10-SC can get from the face to the discharge point and back again for another payload *faster than any other car in its class*. For some of the reasons why, check these features: traction motors of new design, with more reserve power . . . higher-speed, higher-powered conveyor discharge, cutting unloading time as much as half . . . over-capacity wheel units, brakes, gearing and frame for the least possible down-time and maintenance costs. ● There's actually nothing in the field like the 10-SC! Let us give you complete details. **Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Company (Canada) Limited, Galt, Ontario.**

Consult a Joy Engineer

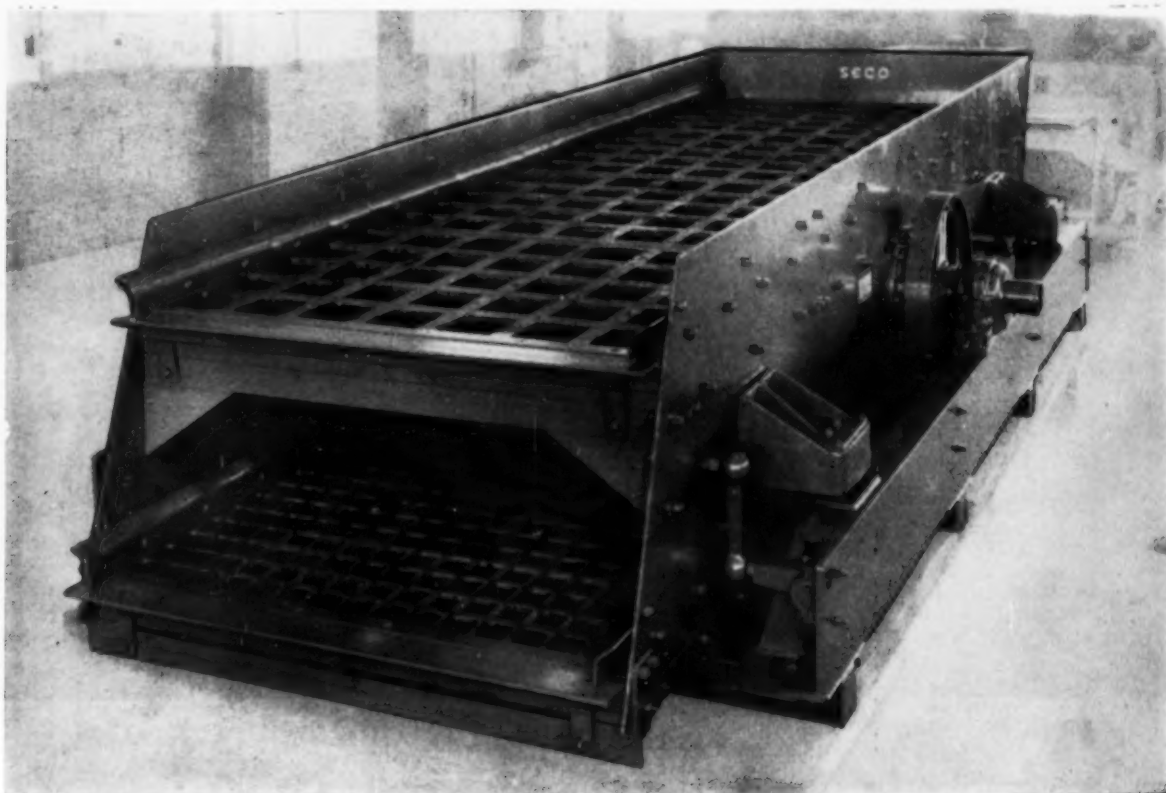


WAD CL4595

JOY

**WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT**

YOU WOULDN'T BUY A HAT THAT DOESN'T FIT



ANY MORE THAN TODAY'S COAL BUYERS WILL TAKE COAL THAT ISN'T SIZED RIGHT

Today, more than ever before, operators who are getting their share of the market for coal are delivering a clean product, in the wanted sizes.

If you're finding increased resistance to the sale of R. O. M. or if your present equipment just isn't capable of producing clean, properly sized coal, *there's something you can do about it!*

You can put a smooth operating Seco vibrating screen on the job. Hundreds of operators have already done so. Result, a better product, a more profitable product, because Seco vibrating screens not only do an excellent job of screen cleaning, and sizing . . . but they do it for pennies per ton. Send for Seco Coal Bulletin #41. Complete descriptive material appears in The Mining Catalogs.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

TURN R. O. M. INTO THE PROFIT SIZES

Seco welcomes the opportunity to discuss your coal cleaning and sizing problems with you. No obligation. For the sake of an efficient, profitable operation why not get the facts now! Write today.

Screen Equipment Co., Inc.

1750 Walden Avenue, Buffalo 25, N. Y.
In Canada: United Steel Corp., Toronto, Ontario



Stocks of Bethlehem wire rope are usually no farther away than your telephone. Warehouse facilities are geared for high-speed service on emergency calls.

Heading your way in a hurry

Ever had a job stalled by a sudden emergency need for wire rope? A job where every hour, every minute, counted?

Those things happen. And when they do it's good to know that you're always near a Bethlehem mill depot or distributor. Through a large, quick-acting distribution system, Bethlehem makes it easy to get the rope you need . . . the proper size, type, and grade. Whether you're out in the sagebrush or working a job in the heart of the city, you're never very far from

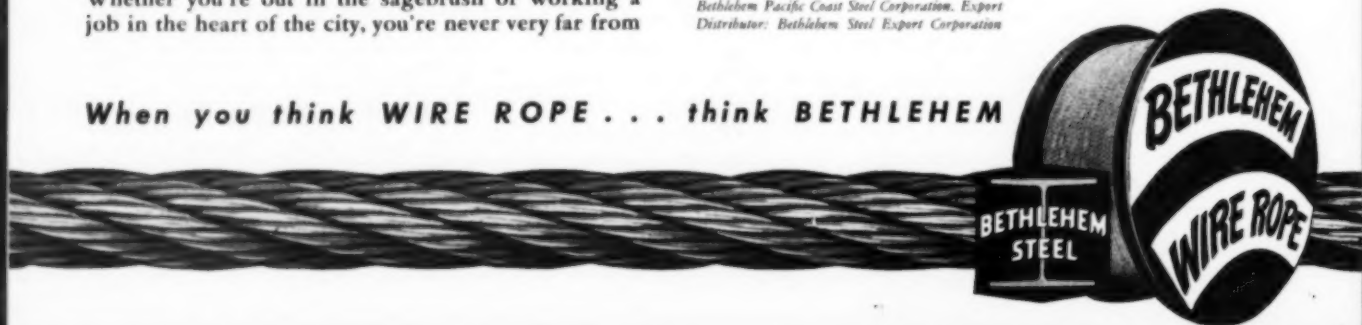
a large, convenient warehouse supply.

So put in a call, outline your needs, and the Bethlehem rope you want will soon be heading your way. Sound, dependable rope. There's none better. And there's no better, friendlier service than Bethlehem and its hundreds of distributors can offer you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

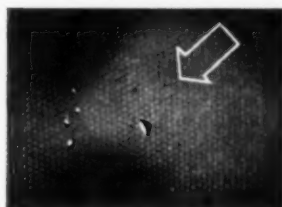
*On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation. Export
Distributor: Bethlehem Steel Export Corporation*

When you think WIRE ROPE . . . think BETHLEHEM



Look What You Don't get with Goodyear Conveyor Belts

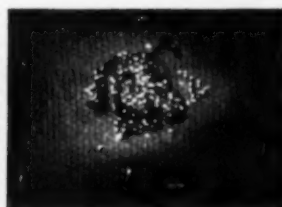
TYPICAL MILDEW GROWTH



A Underside of cover showing cuts where moisture enters and promotes growth



B Top ply of belt showing typical, advanced mildew growth



C Second ply showing advance of mildew through plies

"STOP mildew and you stop a major cause of premature belt failure"—so the G.T.M.—Goodyear Technical Man—has maintained for almost 30 years. And, he can prove his point with thousands of tests and actual installations the world over.

Mildew is the No. 1 "under-the-cover" killer of belts. Mildew created "rot" of the fabric, load-carrying, tension member causes fasteners to pull out, "mushy spots" to develop and circular plugs to drop from the belt.

How mildew works—Exposed fabric at the fastened ends and tiny cuts in the belt cover let in moisture which activates the mildew spores. Aided by darkness and lack of ventilation, the fungus grows and weakens the fabric plies. Incipient crescent-shaped breaks soon develop and the belt fails long before it should.

How to avoid mildew—Stop it before it starts! G.T.M.-specified Coal-Flo belts are all made with high tensile covers, rubber skim coats between plies, and are mildew-inhibited throughout. A fungicide—proved by almost 30 years of use—protects Goodyear Conveyor Belts against attack from every type mildew.

See your G.T.M.—Get the full mildew story and assure yourself of normal belt life. Contact him through your Goodyear Distributor or write to Goodyear, Mechanical Goods Div., Akron 16, Ohio.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

Specified Coal-Flo Conveyor Belts
for Underground Service in Coal Mines
(Mildew-Inhibited Throughout)

A Tough, thick cover of acid-resisting rubber

B Sturdy, horseshoe shaped breaker protects ply edges from fraying and wicking moisture

C Multi plies of strong, sturdy fabric

D Rubber skim-coat between plies increases flex life

A

B

C

D

YOUR GOODYEAR DISTRIBUTOR can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in your Telephone Directory under "Rubber Products" or "Rubber Goods."

Coal-Flo—T. M., The Goodyear Tire & Rubber Company, Akron, Ohio

GOOD YEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

**FREE
NEW
EDITION**

Carboloy Mining Maintenance

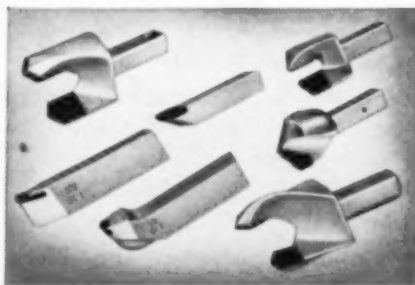
**The most complete handbook in the industry
to help you maintain, conserve and order
carbide mining tools**

**Shows latest sharpening
methods**



Manual section contains 9 pages of detailed instructions and illustrations for sharpening carbide mining tools. Tells what grinding equipment to use and how to use it.

**Makes tool ordering
easier**



Mining catalog section gives design advantages, easy-to-use tables with specifications and order numbers for each Carboloy Mining Tool. Also includes price list.

**Describes modern Carboloy
facilities**



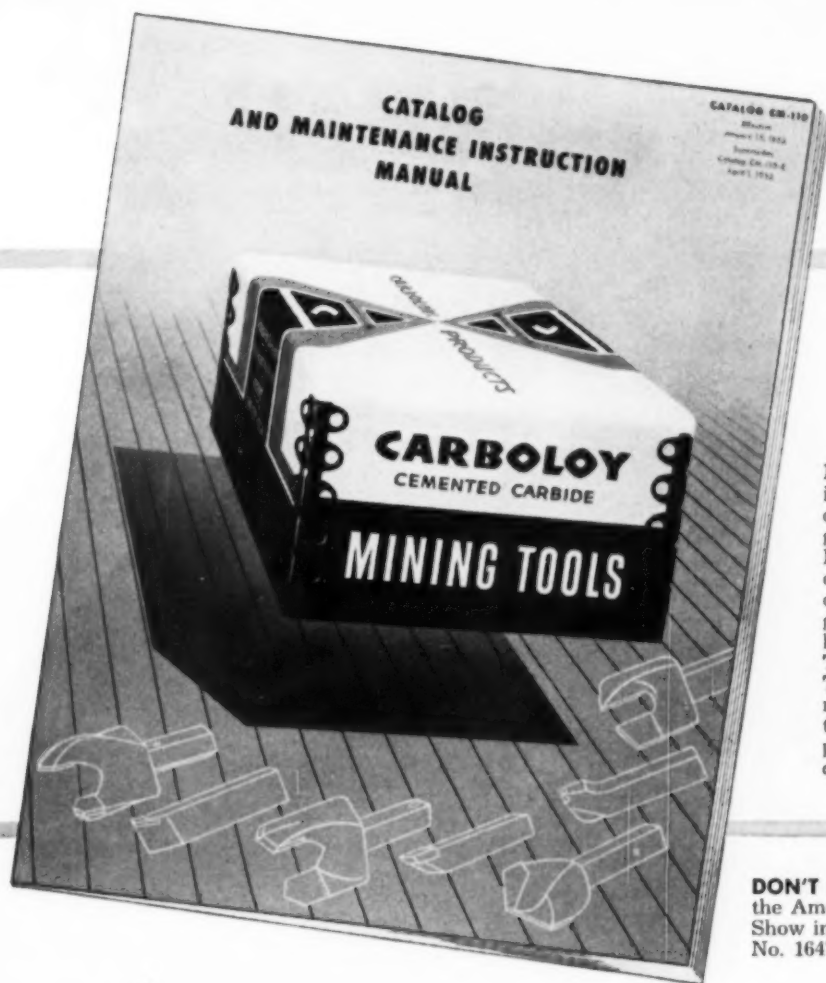
Manufacturing and research section, eight pages in full color, describes the modern Carboloy research and production facilities that make possible mass-produced quality products at low cost.

**Describes free Carboloy
services**



Supplementary services section explains the Carboloy 3-Point Program for getting maximum efficiency from your mining tools. Lists other free Carboloy services and Authorized Carboloy Mining Tool Distributors.

Tool Catalog and Instruction Manual



More than 25 years' experience in the manufacture of high-quality cemented carbides has gone into making Carboloy Mining Tools. A rigid program of 29 individual quality control checks provides the high degree of uniformity that is the keynote of Carboloy quality. Tool up with Carboloy Mining Tools now, and see how tonnage quickly increases; how tools stay sharp for extra long periods of operation; how downtime is sharply reduced.

DON'T MISS the Carboloy exhibit at the American Mining Congress, Coal Show in Cleveland, May 11-14. Booth No. 1647.



MAIL THIS COUPON TODAY

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11120 E. 8 Mile Street, Detroit 32, Michigan

Gentlemen: Please rush me, free of charge and without obligation, Carboloy Coal Mining Catalog and Maintenance Instruction Manual CM-110.

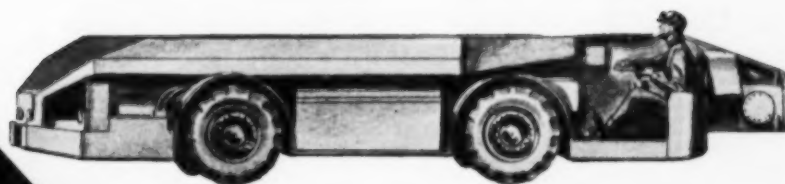
"Carboloy" is the registered trademark of the Carboloy Department of General Electric Company

Name _____ Position _____
 Company _____
 Address _____
 City _____ Zone _____ State _____

The Light



that helps fill
that *Extra* car

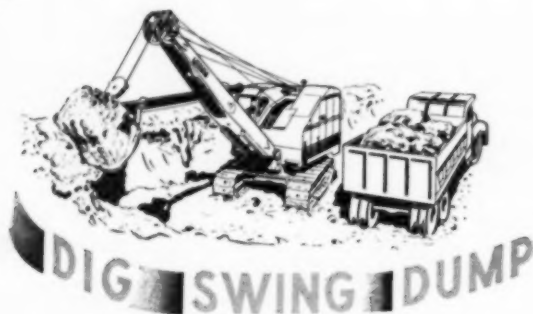


MSA
SAFETY EQUIPMENT HEADQUARTERS

Now . . .

SMOOTH, FAST WORK CYCLE

**counts more
than ever**



and it's yours with the Bucyrus-Erie 38-B

SPEED is a traditional characteristic of Bucyrus-Erie excavators . . . and speed in the individual dig, swing and dump operations tells only part of the story.

Most Compared . . .



Most Preferred

In the Bucyrus-Erie 38-B, working speed starts on the drawing board, where cycle functions are *balanced* with one another (as well as being designed fast in themselves) . . . and coordinated with proper weight distribution. Adding smooth, steady power . . . liberally used anti-friction bearings . . . easy-filling dippers . . . and direct-action mechanical control gives it the overall production speed that has made Bucyrus-Erie the standard of the industry.

Eliminating lost time and waste motion is one *big* way to boost coal production. Now . . . when that counts more than ever before, you can count on Bucyrus-Erie excavators to "deliver the goods." 86E52

BUCYRUS-ERIE CO., South Milwaukee, Wisconsin



This Bucyrus-Erie 38-B's special 2 1/4-yd. coal-loading dipper is just one of many features designed to help you move more coal . . . faster . . . and at lower cost.

BULL'S-EYE for CLEVELAND



**BOOTH
1411**

Shoot straight for the Simplex booth, No. 1411 in the Arcade, at the Coal Show in the Public Auditorium, Cleveland, from May 11 to 14, inclusive. We hope you will come and help make this the most successful coal show ever held.

Representatives of our sales and engineering staff will be on hand to discuss with you the latest improvements in wires and cables used in the mining industry. We like to think that our Simplex booth will be one of the most interesting and helpful. Bring along any problems you may have; the boys will be glad to give you all the help they can.

Why don't you plan now to set aside those days — May 11 to 14, inclusive — to learn what new materials and machinery are available to help you in your job, and also to listen to the expert discussions of mining problems? You will be rewarded.

May we suggest that you plan to make the Simplex booth — No. 1411 — your headquarters for meeting your friends and making new ones.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

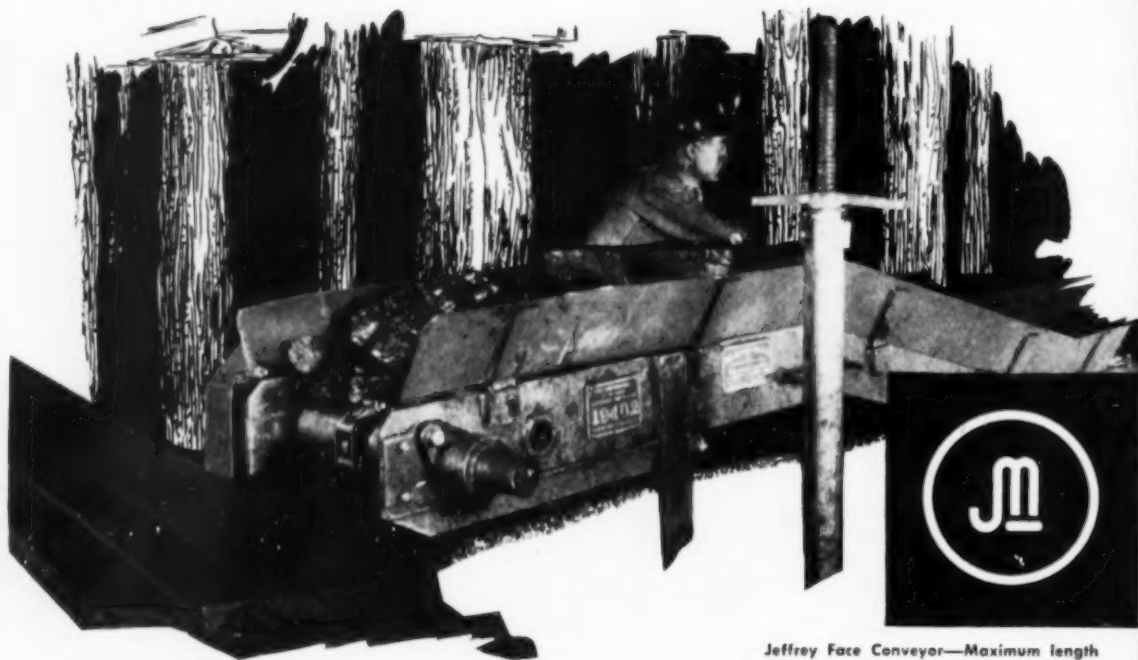
below or on top....it's JEFFREY

Hundreds of successful installations throughout the coal industry provide evidence that where coal is being mined there also you'll find Jeffrey equipment. You can select Jeffrey equipment with confidence . . . that it will meet the requirement exactly whether it is mining underground or preparation topground.

JEFFREY CONVEYORS There is a type and size Conveyor, Chain or Belt, for face, room and entry work in either Bituminous or Anthracite

mine mining. Design and construction of Jeffrey Conveyors are the result of many years experience and a thorough knowledge of mining operations.

JEFFREY CRUSHERS With a variety of Crushers in our broad line, coal-sizing need be no great task. Capacity expected and desired product will help us determine the right unit for your operation. Tests will be made ahead of installation if necessary.

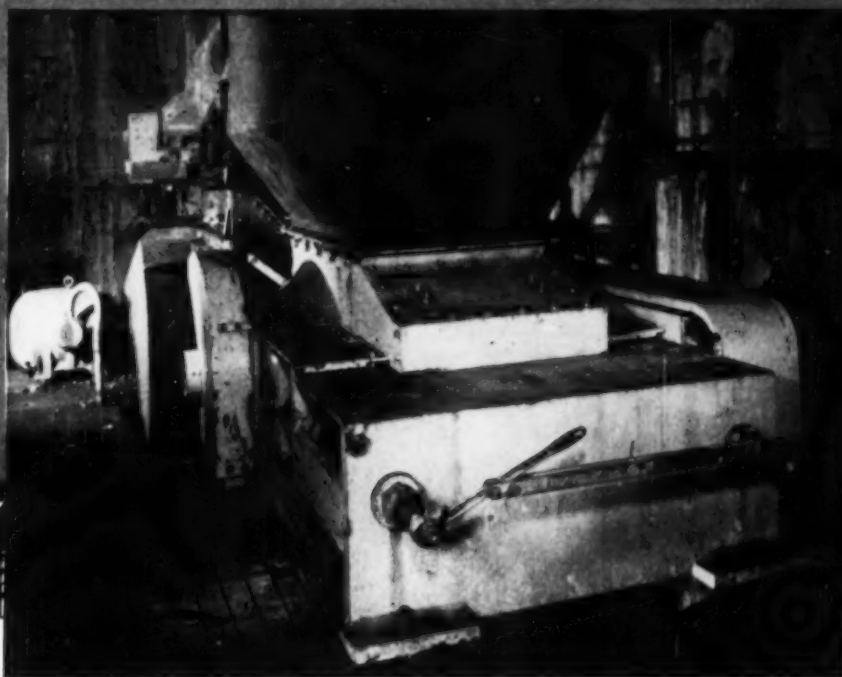


An installation of a Jeffrey Face Conveyor discharging coal into a Jeffrey Room Conveyor for transportation to entry.

Jeffrey Face Conveyor—Maximum length is 90 feet with a capacity of one ton per minute.



Jeffrey 30" x 36"
Double Roll Crusher
sizing coal in a large
Preparation Plant.
Feeding the crusher in
controlled amounts is
a Jeffrey-Traylor elec-
tric vibrating feeder
(shown in rear of
view at the right).



THE JEFFREY

ESTABLISHED 1877
MANUFACTURING CO.

Columbus 16, Ohio

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in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

**IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!**

Coal Cutters

Loaders

Locomotives

Shuttle Cars

Fans & Blowers

Underground Conveyors

Drills & Drilling Mach.

Transmission Machinery

Replacement Parts

Scraper Conveyors

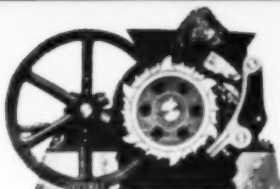
Belt Conveyors

Jigs

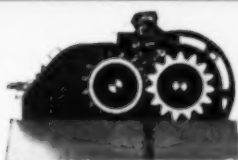
Crushers

Feeders

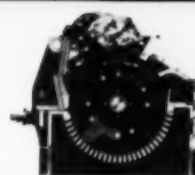
Loading Booms



Cross-section of Jeffrey Single Roll Crusher. Reduces lump coal to 1 1/4" and larger in one operation.



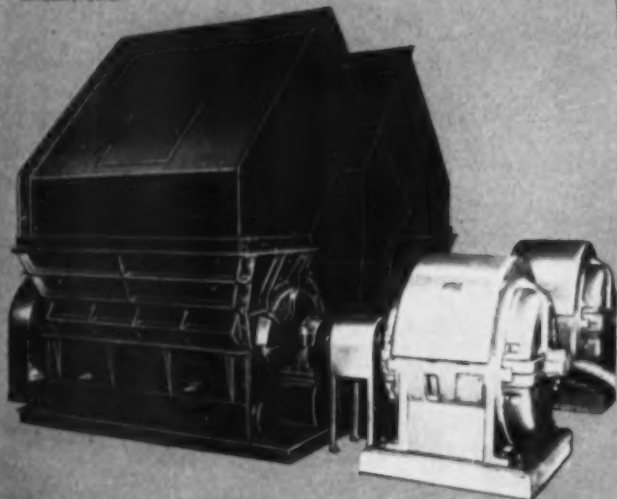
This cross-section shows a Jeffrey Double Roll Crusher, a unit which will handle entire mine output without preliminary sizing or picking. Product range from 4" to 12".



FLEXTOOTH Crusher sectional view. Takes lump coal up to 24" and reduces it to stoker size in a single operation.

Check *American* Quality—Feature by Feature—and you'll know

Four Million Tons of Coal
Crushed in Six Years!
Reducing 16" ROM to a 1/4"
product, at the rate of 900
tons per hour, is the per-
formance record of this
American 600 twin-crusher
installation at the Tidd Plant
of the Ohio Power Co.,
Brilliant, Ohio.



WHY
AMERICAN CRUSHERS
can reduce coal
for less than



per ton

AMERICAN Feature No. 2

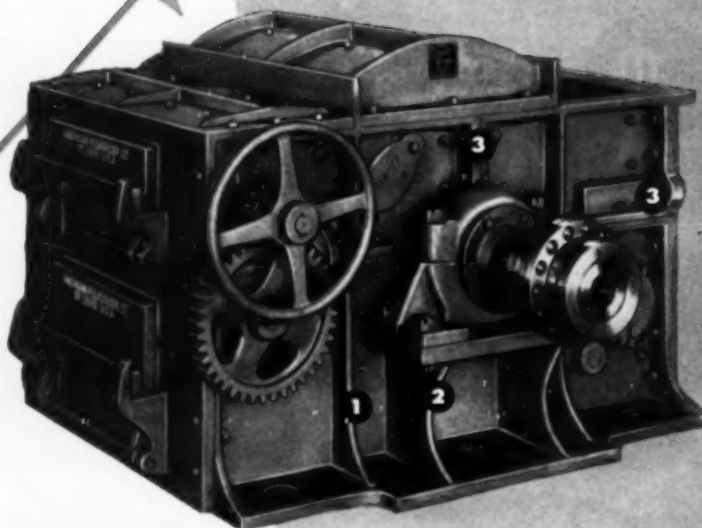
STRONGLY RIBBED STEEL FRAME

The frame of an American Crusher consists of:

- 1** Side Frames of Heavy, Ribbed Steel Castings, accurately machined on special jigs and fixtures. Each abutting joint is machined for dust-tight fit. All other members are of heavy plate steel.
- 2** Integral Bearing Pedestals. Cast in one piece with the side frames to assure maximum rigidity.
- 3** Sectional Design. All members of the crusher frame are securely bolted together by means of coupling bolts rather than machine bolts—to provide a much stronger and more rigid joint. The sectional design permits easy dismantling of the crusher, or quick inspection of parts for check on wear or replacements.

American Crushers are designed for a lifetime of wear. The crushing chamber of every American is completely protected with renewable liners of the proper thickness and material for every job.

WRITE for Coal Crushing Bulletin



American

PULVERIZER COMPANY

*Originators and Manufacturers of
Ring Crushers and Pulverizers*

**1119 Macklind Ave.
St. Louis 10, Mo.**

Progress in Motor Grader Design

Allis-Chalmers new AD-40 shows importance of visibility. Operator can see front wheels — both ends of blade while he works.

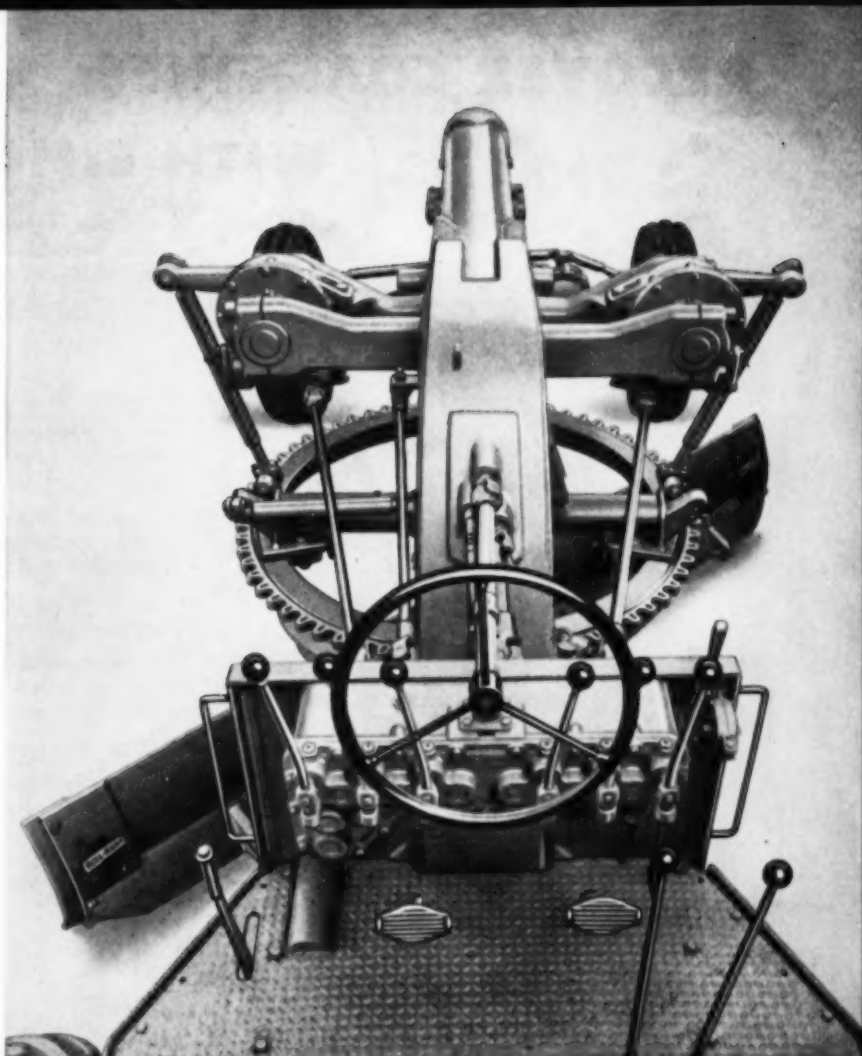
A MOTOR grader operator has to be able to see his work to do a good job, whether he's rolling big windrows or doing highly accurate finishing.

Here is how Allis-Chalmers engineers made sure the new AD-40 met these requirements. They carried A-C's single member frame all the way from the front axle to the platform; cut down the size of the lift cases to eliminate blind spots; lowered the control box and eliminated assemblies from the front panel to provide better visibility of the work area directly in front of the operator; tapered the front edges of the platform so that he could see both ends of the moldboard as he works.

A-C fieldmen also knew that a grader operator likes to sit down whenever the job permits. So they've not only given him ample leg room for stand-up operation but also a steering wheel of adjustable height and a seat that rolls forward at a touch for sit-down operation.

Combined with a new kind of power steering, these advanced design features are making Allis-Chalmers AD-40 an increasing favorite with operators and owners alike because it means more work done with less effort. For more facts on the AD-40, it will pay you to see your nearby Allis-Chalmers dealer soon.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



(above) Here is actual view operator has from platform of Allis-Chalmers AD-40, showing how well he can see both ends of the blade and both front wheels.

(below) The AD-40 has 104 brake horsepower, 23,000 pounds of weight and tandem drive traction, all it needs to do a better job on heavy duty construction . . . a faster job on maintenance.



RECOVER COAL FINES

WITH EIMCO AGIDISC

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal.

These filters will:

1. Reduce moisture contents in the fine coal to 15% or better, depending on the other plant equipment.
2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.
3. Permits uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.
4. Produces greater tonnage of dewatered coal per square foot of filter surface.
5. Save a product that has been considered too expensive to process — providing additional profits per ton of coal washed.
6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.



EIMCO

4649

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment
EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

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EL PASO TEXAS MILLS BUILDING • BERKELEY CALIF. 637 CEDAR STREET
KELLOGG IDAHO 307 DIVISION ST. • LONDON W 1 ENGLAND 190 PICCADILLY

IN FRANCE SOCIÉTÉ EIMCO PARIS FRANCE

IN ENGLAND EIMCO GREAT BRITAIN LTD. LEEDS 12 ENGLAND

IN ITALY EIMCO ITALIA S.p.A. MILAN ITALY

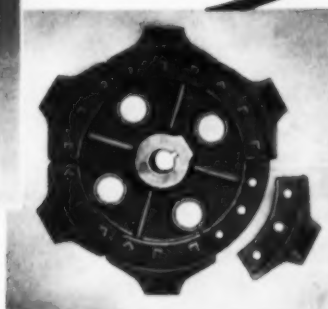
Chicago, Wilmington & Franklin Coal Co's.

Orient Mine No. 3



will have fewer
coal handling
worries . . .

. . . because
wise equipment
engineers specified
ORO Kenkrome
chains and renewable
tooth sprockets —



ORO KENKROME is an alloyed manganese steel, developed especially for use in Coal Preparation Plants to reduce that ever-increasing maintenance cost. All types and sizes of Chain and Renewable Tooth Sprockets are made to exacting specifications, which provides that smooth performance and extra long wearing life.

Years of metallurgical research and development produced these Chains, which will interchange with ordinary standard Chain of the same description, but last many times longer.

The Teeth of the Renewable Tooth Sprockets can be reversed or renewed without disturbing the Chain, which can be done between shifts or during a lunch period. This is a real, "maintenance cost reducer" that shouldn't be overlooked.

Chicago, Wilmington & Franklin Coal Co., like many others, has experienced the freedom from break-down worries which made it imperative to include ORO KENKROME Chain and Renewable Tooth Sprockets for the Preparation Plant at Orient Mine No. 3.



Kensington

STEEL COMPANY

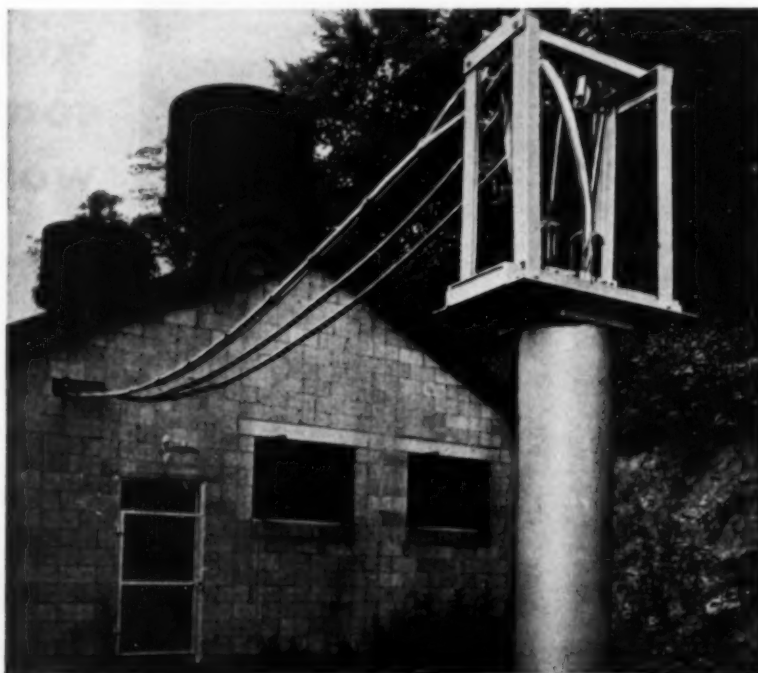
505 KENSINGTON AVE. • CHICAGO 28, ILL.
Subsidiary of Poor & Co. • Chicago

Down come costs.....

with U. S. aluminum borehole cable

● Insulated aluminum cable costs *less* than copper cable and *far less* than armored copper cable. Aluminum needs no supporting armor because it can easily support its own light weight in boreholes of great depth. A 500,000 CM insulated aluminum cable is *less than half* the weight of an identical copper cable. It is furthermore easier to handle and its light weight speeds up every operation connected with its installation. It also makes possible fewer, simpler lower-cost supports.

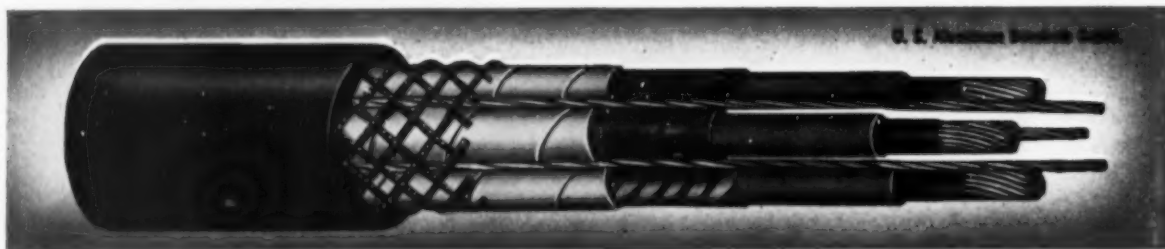
United States Rubber Company is the only manufacturer of wire and cable that grows its own natural rubber and makes its own synthetic rubber and plastics. This quality control means the ultimate in electrical insulation.



COMPARISON OF THE CURRENT-CARRYING CAPACITY, WEIGHT AND RESISTANCE
OF SELECTED COPPER AND ALUMINUM WIRES AND CABLES

	Open-Air Current-Carrying Capacity Amperes		Weight Per 1,000 Ft., Pounds		Resistance 1,000 Ft., 25 Deg. C Ohms	
	R Copper	HN Aluminum	R Copper	HN Aluminum	Copper	Aluminum
2/0.....	225	222	541	274	0.0842	0.134
4/0.....	300	302	816	380	0.0525	0.0843
500,000.....	515	520	1,831	787	0.0222	0.0357
750,000.....	655	660	2,716	1,129	0.0148	0.0238
1,000,000.....	780	785	3,546	1,437	0.0111	0.0178
1,250,000.....	890	895	4,400	1,699	0.0089	0.0145

For this free booklet on wires and cables for the coal industry write to address below.



UNITED STATES RUBBER COMPANY

Electrical Wire and Cable Department

Rockefeller Center

New York 20, New York

U.S. RUBBER
SERVING THROUGH SCIENCE

Eaton 2-Speed Axle Trucks



More than a
Million-and-a-Half
in Trucks Today!

**are easy on
engines, drivers,
and pocketbooks!**

The right gear ratio for every situation means engines operate in their lowest-cost speed range. Easy shifting, greater maneuverability, faster get-away with Eaton 2-Speeds—reduce driver fatigue. Quicker full-load trips, longer truck life, less maintenance—mean minimum hauling costs. Have your truck dealer prove it.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO



PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

*Men who depend on power...
know they can depend on*

CUMMINS®



CUMMINS DIESELS

are engineered to make light work of tough jobs



Why do so many mine operators count on Cummins for dependable power in toughest going?

You'll find part of the answer in the special kind of versatility that belongs to Cummins Diesels alone. It's versatility that goes beyond the handling of all kinds of jobs. It's actually an ability to meet every power requirement that any situation demands . . . to save on fuel, do more work per dollar, whether the call is for continuous power or stop-and-go operation over a wide and flexible speed range.

Yes, you can count on a (60-600 h.p.) Cummins Diesel for dynamic versatility in every job—performance that stems from an exclusive fuel system and precision engineering. See your Cummins dealer for all the facts. He's a diesel specialist . . . ready to help solve your power problems.

***Leaders in rugged, lightweight
high-speed diesel power!***

CUMMINS

CUMMINS ENGINE COMPANY, INC.

Columbus, Indiana

Export: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U.S.A.

Cable: CUMDIEX



THE SCREENS in this centrifugal dryer are Stainless Steel. The top row, subjected to the most wear, is replaced after 3000 tons. The middle row lasts 6000 tons and the bottom row 9000 tons. The $\frac{3}{4}$ " round hole screens were manufactured by Hendrick Manufacturing Co., Carbondale, Pa.



PREPARATION ENGINEER George Kennedy examines one of eight Stainless Steel blades on an impeller fan. The blades draw 50,000 cubic feet of air per minute through the drying system at a temperature of 100°F.

Stainless Steel dryer screens mean less blinding and longer equipment life at Rochester-Pittsburgh Coal Company

DURABLE, corrosion-resistant Stainless Steel plays a variety of roles in drying equipment at the Waterman preparation plant of the Rochester-Pittsburgh Coal Company, Indiana, Pa. But in every application it contributes to long, trouble-free equipment life.

On the Vissac dryer, blinding has been minimized by use of Stainless Steel wedge bar screens. Eight screens, 39" x 59" with 1 mm. slots, are used with operating temperatures of 900°F. inlet and 100° outlet.

Impeller fan blades which draw hot gases from the furnace to dry the coal are Stainless, too. Pulling 50,000 cubic feet of air a minute through

the system at 100°F., the eight blades in the fan are replaced at intervals of about six months—far longer service life than if they were made of other materials.

Twenty-seven $\frac{3}{4}$ " round hole Stainless Steel screens are used in a centrifugal dryer at the plant. Coal enters this dryer with about 30% moisture and leaves with about 7%. The screens are in three rows of nine screens each with the top row, at the feed end, receiving the most wear. Top row screens are replaced after 3000 tons, the second row after 6000 tons, and the bottom row after 9000 tons.

Stainless Steel's resistance to cor-

rosion and wear, its freedom from blinding and its ability to maintain hole size make it the best screen material you can obtain. Take steps now to cut operating costs in your preparation plant by specifying Stainless for screen and for other equipment where corrosion and abrasion take their toll. And for finest performance, ask your fabricator to use U·S·S Stainless Steel. Write for our booklets, "U·S·S Stainless Steel Screens" and "The Sunnyhill Story," which show the many ways Stainless Steel can cut costs in preparation plants. United States Steel Corporation, Room 2811-B, 525 William Penn Place, Pittsburgh 30, Pa.

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · RILLETS



PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

3-648

UNITED STATES STEEL

PARMANCO HI-SPEED HORIZONTAL DRILL

Completely Re-designed Around a 40 H.P. Engine

•
**Drills
a 6-inch
Hole in
two-thirds
the
ordinary
time**
•



Included in the new design is an auger rack which saves on drilling time. The augers are on the machine as it is moved from hole to hole. Another feature, for faster set up and smoother drilling, is the four individually adjustable leveling jacks. Automotive steering is optional.

This HI-SPEED DRILL is designed for drilling 5-6-8 in. holes to 100 ft. or more. The 40 h.p. engine with four drilling speeds makes possible the reduction of footage time by one third. This new drill, the very latest in design, is equipped with self starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

PARIS MANUFACTURING CO. **PARIS ILLINOIS**

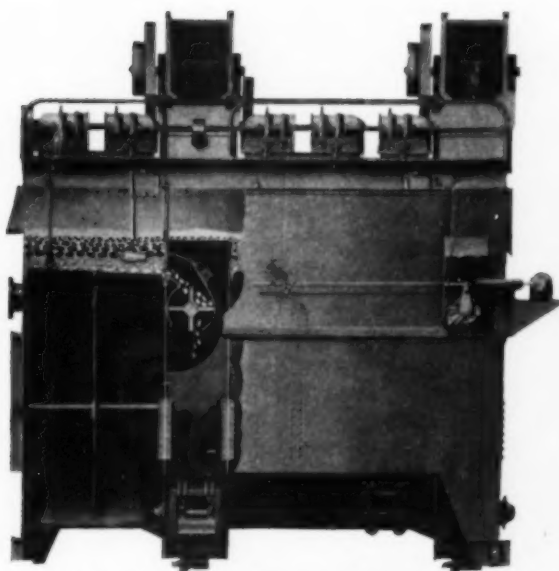
For the very best in Coal Preparation—Jeffrey Equipment and Jeffrey "Know How" combine for maximum efficiency and economy.

Jeffrey quality equipment for Coal Preparation ranges from unit machines such as jigs, washers, crushers, feeders, screens, picking tables, loading booms and conveyors to COMPLETE

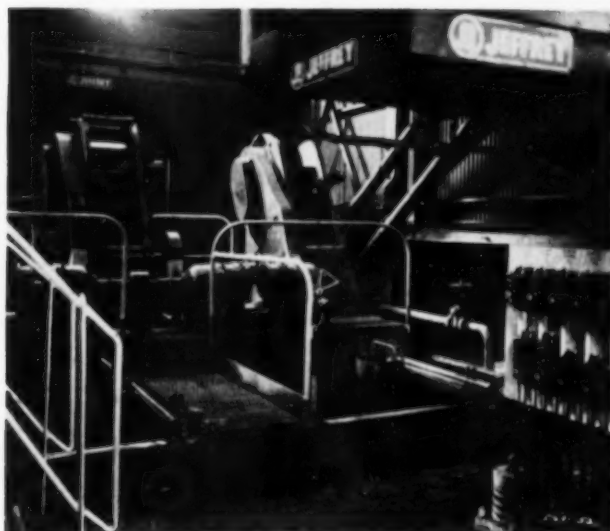
new plants designed, erected and fully equipped.

Jeffrey "Know How" is the result of many years of intimate contact with and close study of all phases of this work by our engineering staff. Acquaint yourself with Jeffrey Service—write for Catalog No. 815-A.

JIGS AND RELATED EQUIPMENT FOR COMPLETE COAL PREPARATION



Jeffrey 84" Air-Operated BAUM JIG, two compartment, 5-cell.



Installation view of Jeffrey 72" BAUM JIG, two compartment, 4-cell.



THE JEFFREY

ESTABLISHED 1877
MANUFACTURING CO.

Columbus 16, Ohio

**IF IT'S MINED, PROCESSED OR MOVED
...IT'S A JOB FOR JEFFREY!**

*sales offices and distributors
in principal cities*

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

Another
satisfied user of
SCHRAMM
AIR
COMPRESSORS
writes...

DE ANGELIS COAL COMPANY,
Anthracite Miners & Shippers



PHONE NO. 22

1920



CARBONDALE, PA.

January 15, 1953.

Medico Electric Motor Company,
11 Tompkins Street,
Pittston, Pennsylvania

Attention : Mr. William Medico, President
Reference : Model 105 "Schramm" stationary air compressor -

#152187-S

Dear Mr. Medico :

Our program for 1953 will demand additional air compressor equipment. In checking the record of our last compressor purchase from you, we find that the Model 105 "Schramm" stationary, vertical, water-cooled air compressor, serial No. 152187-S, has been in continuous service since late November, 1944. This means that the unit, according to our records, has had over 15000 hours of continuous, satisfactory service. We cannot help but feel that this is quite a record in itself.

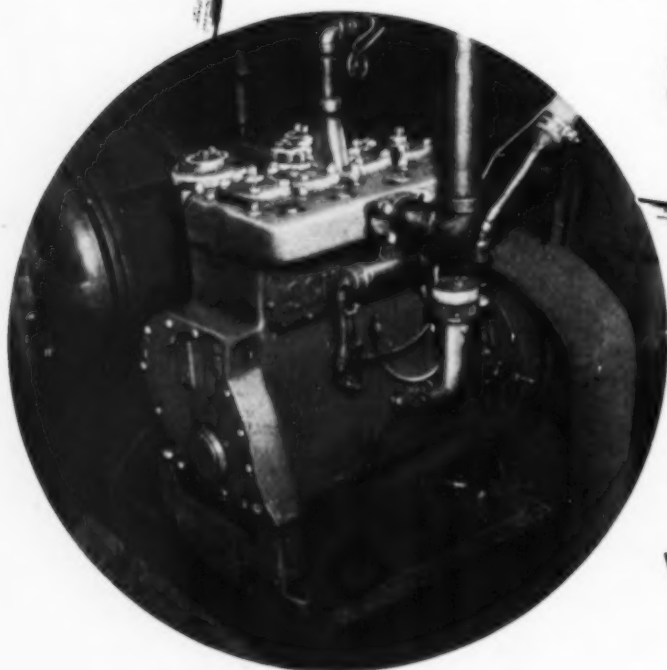
However, the most amazing discovery is that we have never spent as much as five cents for replacement parts. The outfit still has its original valves, bearings, gaskets, etc. Our plant engineer further confirms this statement. Eight years of satisfactory service and not a cent for repairs. This must be a record! You are privileged to use this report to acquaint your other customers of our experience with this unit.

Naturally, we are inclined toward another dependable "Schramm" air compressor and I would like you to stop in and recommend the correct capacity "Schramm" that we desire to install as soon as possible.

The dependable performance of the equipment you sell to us is a source of great satisfaction and it always is a pleasure to do business with your company.

Very truly yours,

De Angelis Coal Company.
Joseph De Angelis



SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA



Illustrated is Thermoflex—a mandrel-built hose with extra strength, designed specifically for use in mines.

When you are in need of hose— Suggest you look at Thermoid!

See how extra strength is built into each length—with either tough rayon cords or special cotton fabric. Abrasive resistant—light—easily handled—resists kinking—designed for maximum service.

Whether it be one of Thermoid's multiple service types or a hose designed for a specific use, your Thermoid Distributor can recommend the type best suited for your particular requirements.

Call your Thermoid Distributor. He has complete information on all types of Thermoid Hose and other Thermoid products. Our experienced Sales Engineers are available for help with unusual problems.



It will pay you to specify Thermoid.

Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.N.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



You just can't make it with old methods today

It's an accepted fact today, proved by one change-over after another, that the S-D Automatic system of coal flow from mine to preparation plant is the only method that guarantees a balanced operation under complete cost control.

Continuous and balanced flow of coal from face to preparation plant depends on two factors. First, the speed and efficiency of S-D Automatic cars dumping on the move. Second, an adequate surge bin which serves as a temporary storage for coal in transit . . . a "fluid coupling" enabling coal mining and coal preparation to function independently of each other.

With an adequate surge bin and S-D Automatic cars, one shift operation of cleaning plant is often sufficient to take care of two

shift operation of mine. Delays at the preparation plant need not stop mine production because the surge bin stores the coal. On the other hand, the bin continues to supply coal to preparation plant if a hold-up occurs at the face.

The photograph above shows the modern method of mining coal. In this case, however, three surge bins—a hillside bin and a symmetrical bin on one side of the gorge and another hillside bin on the opposite side, all served by S-D Automatic Cars, feed coal into one preparation plant.

This, simply stated, is the S-D Automatic System for low cost coal production.

SANFORD-DAY IRON WORKS
KNOXVILLE TENNESSEE

Devoting Our
Entire Capacity
to the Building
of Better Mine
Cars for Over—

50
YEARS

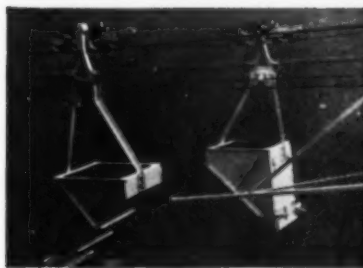
Aerial tramways give low-cost transportation



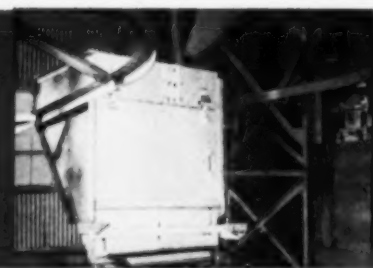
This 8,775 foot bicable tramway has been in continual operation for 23 years, transporting large quantities of coal at low ton-mile cost and giving dependable all-weather service.

The tramway has two stationary track cables and a traction rope that moves continuously in one direction. Buckets clamp to the moving rope at 205 foot intervals and move at 500 feet per minute. The 48 cu. ft. end dump buckets load and unload automatically. For loading, buckets detach from traction rope, run on graded rails, and attach again after being loaded. Detaching and attaching are also automatic.

This aerial tramway was designed and installed by the Tramway Division of U. S. Steel at the Alloy, West Virginia, plant of Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation.



Conveying materials for a few hundred feet or for several miles, Columbia-Geneva Tramways can be built to handle from 1½ to more than 300 tons hourly. They can be designed to meet almost every type of operating condition, and to handle many kinds of commodities easily and economically—from a tray of optical lenses to a carload of lumber.



Load carriers, like this one on a bicable tramway, are available in many different types and sizes. Services of Columbia-Geneva's Tramway Division include designing the tramway...supplying the steel...excavating for foundations and erecting support structures...furnishing and installing all wire rope, cables, and electrical and mechanical parts.



Tramway support structures are of many types, depending on terrain and job. Because of this flexibility, tramways are free of ground contour, roads, railroads, etc., are unhampered by bad weather, and can climb extremely steep grades. Other advantages: loads can be moved without rehandling and rights-of-way are easier to acquire.

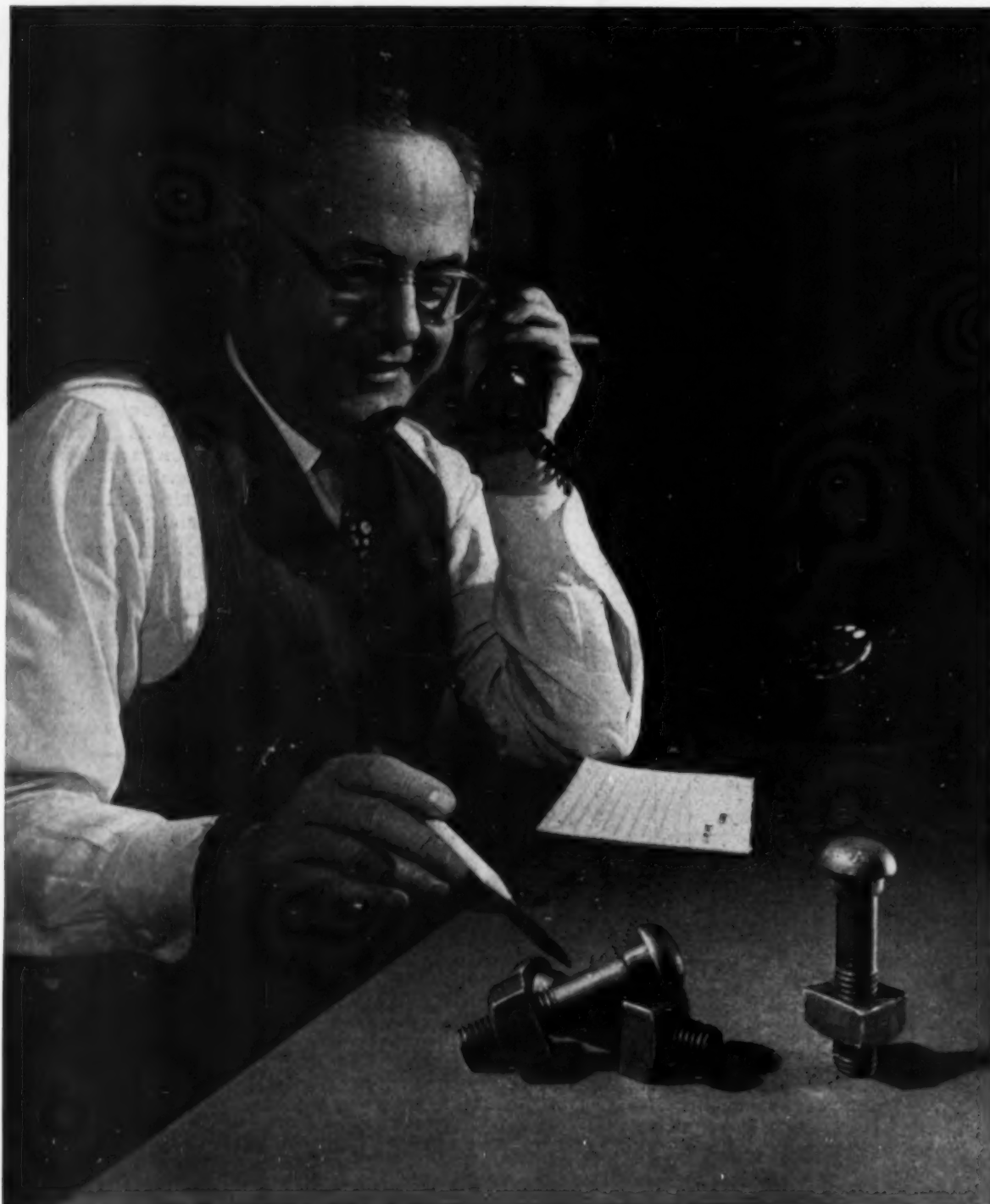
Send for this free manual on aerial tramways. Write on your letterhead today to the Tramway Division, Columbia-Geneva Steel, 141 Battery St., San Francisco 6, Calif. Or for an expert study of your transportation needs, ask for the services of a Tramway Engineer. He can show how an aerial tramway would pay off for you, and he can contract for its design and all phases of its construction, including materials.



Tramway Division
Columbia-Geneva Steel

Division United States Steel Corporation

UNITED STATES STEEL



"I'd say we've been using Bethlehem Track Bolts for ten years, at least.

They're good bolts, Jim. Good quality. You can take it from me."





Use Du Pont Iron Wire Caps for more economical, efficient coal production

Designed especially for coal-mine use, Du Pont Iron Wire Electric Blasting Caps have three outstanding advantages:

- (1) *Economy . . .* Iron wire costs less than copper wire.
- (2) *Better visibility . . .* Brilliantly white insulated wires are easy to spot against the face.
- (3) *Easy removal . . .* Magnetic separators readily remove the iron wires from broken coal.

And like all Du Pont Electric Blasting Caps, the Iron Wire Caps have plastic insulation, rubber plugs, and shielded shunts for maximum safety.

You're sure of economical, reliable blasting operations when you use Du Pont Iron Wire Caps in your mine. Contact your Du Pont Explosives representative . . . he'll gladly help you determine the product most suited to your particular needs. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT EXPLOSIVES

Blasting Supplies and Accessories



BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY



You get more welding area with this Tigerweld BF-12 bond

THE Tigerweld BF-12 Rail Bond has a raised shoulder that forms a V-notch between track and bond. This gives you more welding area than any other bond of similar design, so you can lay on plenty of metal to guarantee a low-resistance connection.

The BF-12 is easy to install. You drive the terminal on to the track with 2 or 3 sharp hammer blows, and it *holds itself* in place while you make a simple

steel-to-steel weld. The welding heat cannot harm the connection between the strand and terminal because all Tigerweld Bonds are butt-welded. A butt-welded joint is stronger than the strand itself and assures a permanent, low-resistance bond.

Get complete information about this and other Tigerweld Rail Bonds. Write to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

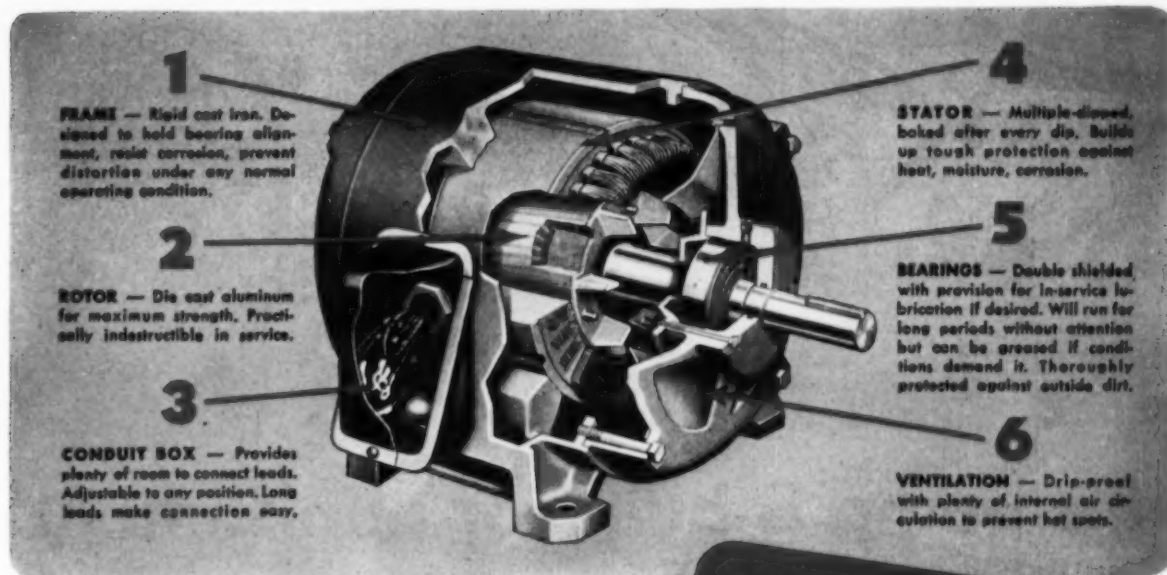
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U-S-S American Tigerweld Rail Bonds



UNITED STATES STEEL

Look for These 6 Signs of Good Motor Design



Get Allis-Chalmers Motors for these Extra Values!



Certified Service — Nearly 100 Allis-Chalmers Certified Service Shops provide factory-approved parts and service on your Allis-Chalmers motors. Screened for modern equipment, adequate experience and business integrity, these independently owned service shops will provide you with prompt, economical repair and maintenance.

Complete Drives from One Source — Allis-Chalmers can supply your complete drive — motor, control and Texrope V-belt drive — from one convenient, reliable source.

Application Engineering — Your Allis-Chalmers District Office representative or Authorized Dealer will be glad to help you select exactly the right motors for your needs. For additional information, write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6052.

A-3954

Texrope is an Allis-Chalmers trademark.

ALLIS-CHALMERS



Sold . . .

Applied . . .

Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.



CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE V-belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.



PUMPS — Integral types from 3/4 in. to 72 in. discharge and up.



this pump is built for punishment!

This is the Fairbanks-Morse Trash Pump for strip or shaft mine service—designed and built along rugged lines—built to take the roughest punishment!

Tough treatment, debris-filled water, pumping long distances, being dragged by a tractor, or dropped into a pool by a drag-line—all this in a day's work for this pump.

See your local Fairbanks-Morse dealer—
or write Fairbanks, Morse & Co., Chicago
5, Illinois.

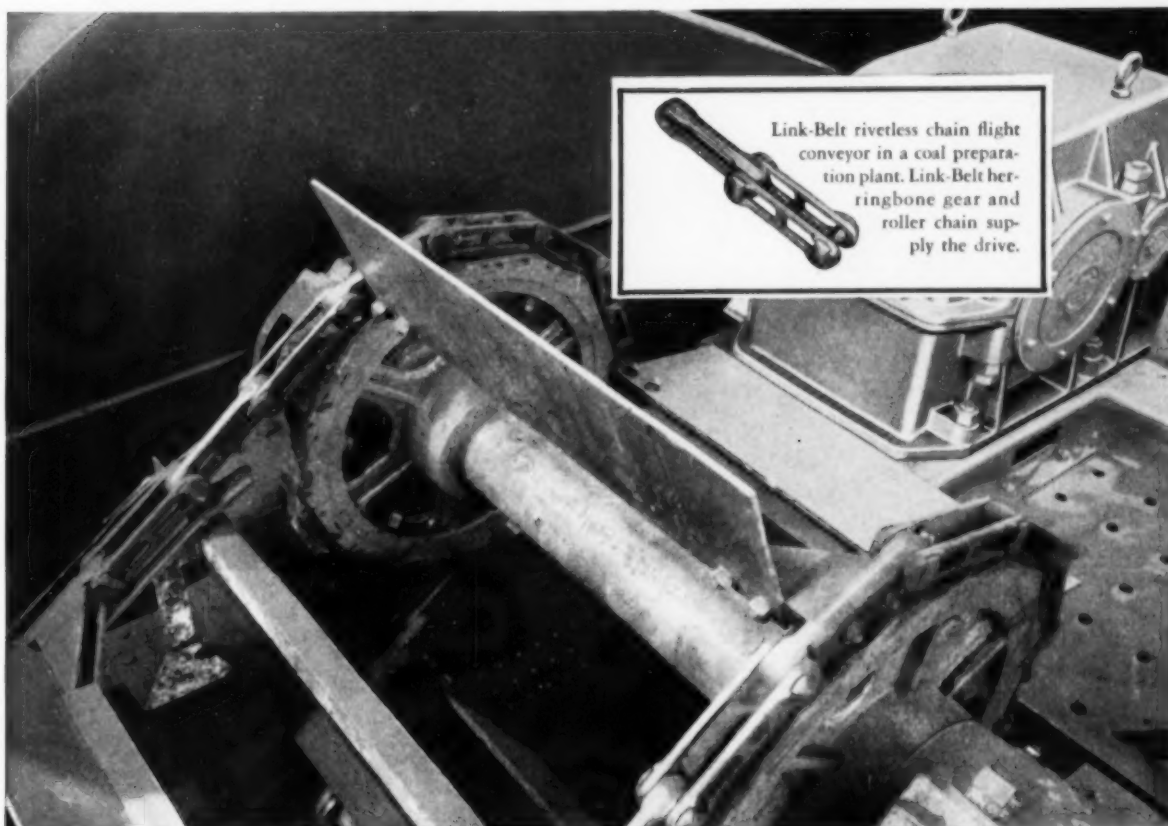


FAIRBANKS-MORSE

a name worth remembering when you want the best

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Is there ONE chain that best meets your drive or conveyor problem?



Link-Belt rivetless chain flight conveyor in a coal preparation plant. Link-Belt herringbone gear and roller chain supply the drive.

You'll find the answer in LINK-BELT's complete chain line... a size and type for every job

The application shown above is an example of how you can select the *one* chain best suited for a particular need from the complete Link-Belt line. And each chain is engineered to provide more efficient service at lower cost than so-called general purpose chain.

Whatever your requirements, you are assured of the *right* chain for the job when you rely on Link-Belt. And, remember—a chain bearing the Link-Belt double arrow is your guarantee of longer chain life.

For information on the complete Link-Belt chain line, see the Link-Belt representative near you. He has the answers for efficient, low-cost drive and conveying chain performance.

LINK-BELT
CHAINS AND SPROCKETS

Typical chains from the complete LINK-BELT line



Ewart Detachable Link-Belt—A widely used, popular chain for average or normal-duty service on conveyors, elevators and drives.



Class 400 Pintle Chain—Closed end design keeps out dirt, makes excellent service medium for drives, elevators, conveyors.



Class 1100 Roller Chain—For rolling conveyors and inclined rolling elevators operating under normal conditions.



Link-Belt Precision Steel Roller Chain, standard pitch, for high-speed drives or conveyors.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.

12,101



You can have mine track that's just as fine!

Here's track that invites the motor-man to open up. He can bowl along with full assurance that every rail, joint, switch, frog, and crossing is properly aligned, sturdy and secure.

It's a Bethlehem prefabricated track layout, built for speed, safety, and all-around low-cost haulage. It not only enables rapid trips that are sure to arrive, but it requires far less upkeep than a makeshift track system. It will carry heavier loads for years and years.

In designing this layout (only a small part of which is visible here), we followed our usual practice of studying every detail of the customer's haulage problem. Then we submitted a plan; and after the plan

was fully approved, we went to work on the track itself—cutting the rails to proper lengths, curving to proper radii, fabricating the turnouts, switches, switch stands, crossings, guard rails, braces, and other components.

Result: track that meets the customer's requirements right down to the last spike.

Your own needs may be different. But Bethlehem engineers can help, whatever your haulage problem is. No two systems are ever alike, and when you call us in, it becomes our job to design and build the layout for your individual mine. Whether the track is for surface use or underground, it will tone up your haul-

age, make it safer, and greatly reduce your maintenance costs. And at the same time you'll have a layout built for speed.

Ask us to give you details. We'll be glad to go into the whole story at your convenience.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM PREFABRICATED TRACK

"Faster Work
Cycles with the

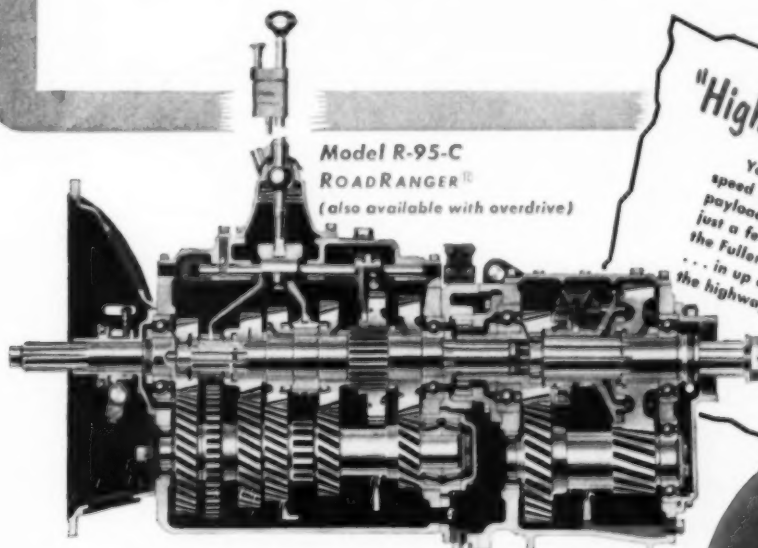
FULLER

ROADRANGER!



"To get the advantage of less shifting and higher speeds we use only Fuller ROAD-RANGER-equipped trucks on the longer, steeper hauls from our '500-Pit,'" says Henry E. Fitch, General Superintendent of Black-foot Coal Company, Oakland City, Indiana.

"Standard Fuller 10-speed transmissions do an excellent job on the lesser grades of our '550-Pit' . . . but we use the ROAD-RANGER units to keep up work cycles with 45-ton-plus loads on the longer haul, with its up to 5% grades."



Model R-95-C
ROADRANGER[®]
(also available with overdrive)

"Higher Average Speed on Grades"

You hear it everywhere . . . "higher average speed on grades . . . less driver fatigue . . . more payload . . . use lighter engines . . ." And that's just a few of the many things they're saying about the Fuller ROADRANGER. North, east, south, west . . . in up and down hauling, in dense traffic . . . on the highway and off . . . fleet operators are turning to the new efficiency of this 10-speeds-with-one-lever transmission.

They like the ROADRANGER because of these advantages:

- 1 No gear splitting—10 selective gear ratios, evenly and progressively spaced.
- 2 Easier, quicker shifts—28% steps—one shift lever controls all 10 forward speeds.
- 3 Higher average road speed—engine operates in peak hp range with greater fuel economy.
- 4 Less driver fatigue—1/3 less shifting.
- 5 Range shifts pre-selected—automatic and synchronized.
- 6 More compact than other 10-speeds.
- 7 More cargo on payload axle.



FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN


Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

TO HELP SELL COAL...


BCI Advertises to the Industrial, Commercial and Institutional Markets.

Each month, full-page messages like the one shown below—featuring either “off-track” or “on-track” installations—appear

in the pages of *Business Week*, *Nation's Business* and a carefully selected group of power journals and trade magazines.




NEW PLANTS LIKE CATERPILLAR'S BURN COAL THE MODERN WAY!



**Mr. R. H. Bachman,
Plant Maintenance Engineer,
Caterpillar Tractor Co., says:**

“Our new plant pictured above was recently completed at Joliet, Illinois. A completely up-to-date coal installation was chosen to handle the heat and process steam requirements. To the right is a picture of the firing aisle showing how the boilers are fed by dust-tight chutes from overhead bunkers. This modern equipment makes coal as clean, convenient, and efficient as a fuel can be! The boilers are rated at 50,000 lbs. of steam per hour, but have handled loads as low as 3,000 lbs. per hour without difficulty.”



For big savings, build for COAL! That's a good rule to follow whether you've got a new plant under construction or an older plant being modernized.

Up-to-date coal-burning equipment can give you more steam per dollar . . . modern coal- and ash-handling systems can cut labor costs to a minimum. In addition, coal is the only fuel with virtually inexhaustible reserves. And to mine this coal, to better prepare it for customers' special needs, America has the world's most productive coal industry. Thus, coal users get a double advantage—dependable supply of an ever better product, at relatively more stable prices.

For heat, power, process steam—coal is your best bet! Ask a consulting engineer. He'll show you how to cut both fuel and operating costs by burning coal in a modern plant designed to meet your specific needs.

If you operate a steam plant, you can't afford to ignore these facts!

- COAL** in most places is today's lowest-cost fuel.
- COAL** resources in America are adequate for all needs—for hundreds of years to come.
- COAL** production in the U.S.A. is highly mechanized and by far the most efficient in the world.
- COAL** prices will therefore remain the most stable of all fuels.
- COAL** is the safest fuel to store and use.
- COAL** is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association,
Washington, D. C.

FOR HIGH EFFICIENCY  FOR LOW COST
YOU CAN COUNT ON COAL!



***in WIRE ROPE, too, extra strength
demands the RIGHT KIND of muscle***

Towering as high as eight feet on his hind legs, the Kodiak or Alaskan Brown Bear ranks as the most powerful animal of North America. Rugged muscle development makes him the feared and deadly fighter that he is.

In wire rope, too, the right kind of muscle is essential to ward off the destructive effects of abrasion, corrosion, bending fatigue, load strain and shock stress.

That's why in Wickwire Rope we make sure—through complete quality control—that you always get the right construction and lay of the rope...the right grade of steel and size of wire for long-lasting resistance to the rigors of your particular service.

See your Wickwire Rope distributor or contact our nearest sales office.



1222

A YELLOW TRIANGLE
ON THE REEL IDENTIFIES
WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

WICKWIRE ROPE



PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

MAKES MORE

FOR MORE MINES

than any other kind

The largest selling bits for use with mechanical coal cutting machines are Bowdil Bits. Such popularity is deserved by performance, long life and low cost operation in a growing list of mines throughout the world.

Made of special alloy steel and heat treated by the most modern methods to hardnesses best suited to your cutting conditions, Bowdil Bits are available in special shapes, cutting face contours and clearance angles to fit your needs.

A nearby Bowdil Service Man or Representative will be pleased to give you further information. Write for our latest bulletins on Bowdil Mining products.

**AT THE COAL SHOW
Booth 1006**

BOWDIL

COAL CUTTING EQUIPMENT
CANTON OHIO

BIGELOW-LIPTAK

Coal Dryer Furnaces

FEATURE



THIN WALLS

...in the heat of things

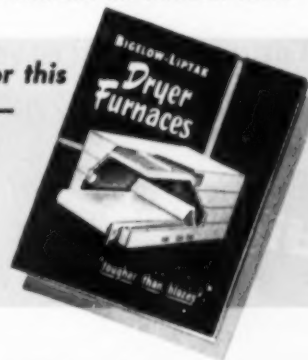
Special air inlet tile—developed from B-L's modern, unit-suspended thin wall—cuts maintenance to the bone in this coal dryer furnace.

The furnace furnishes 93,000,000 BTU's at a temperature of 1200° F to a rotary dryer. This application of thin wall construction features a specially-designed air inlet tile.

Ample furnace volume is provided to permit efficient stoker operation. The air-inlet tile permits tempering air to be drawn into the enclosure to reduce the flame and furnace temperature. Adjustable louvers located in the upper front and side walls draw outside air over the arch and down into the wall air lanes and into the furnace. When a constant volume of gases at a certain temperature is desired, it is only necessary to adjust the louvers. Radiation losses are reduced to a minimum by recovering and re-introducing the pre-heated air into the furnace.

Bigelow-Liptak dryer furnaces furnish heat for the coal, chemical, lumber, salt, sugar, grain and other industries.

Write for this
catalog—
today!



BIGELOW-LIPTAK Corporation

and Bigelow-Liptak Export Corporation
2550 W. GRAND BLVD. • DETROIT 8, MICHIGAN

UNIT-SUSPENDED WALLS AND ARCHES

In Canada: Bigelow-Liptak of Canada, Ltd., Toronto, Ontario

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PITTSBURGH • PORTLAND, ORE. • ST. LOUIS • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SAULT STE. MARIE, MICH. • SEATTLE • TULSA • VANCOUVER, B.C.



The Big Swing is to MANITOWOC

There's a big swing to mighty Manitowocs all through the mining industry—a big replacement trend as more and more operators, after studying costs and production figures, switch to Manitowoc.

You'll find Manitowocs ideally suited to your job too, because they're specially designed for mining. You'll find features no other excavator can match size for size—extra long hi-lift shovel booms for loading and stripping—extra long dragline booms with big bucket capacity for long reach and big yardage—long crawler lengths for maximum stability and flotation—more

power on the bucket because of main machinery simplicity—and the exclusive TORQUE CONVERTER DRIVE which adds extra yardage and faster production on every cycle.

Ask the Manitowoc owners in your vicinity—check for yourself—find out why the big swing is to Manitowoc. Manitowoc Engineering Corp., Manitowoc, Wisconsin.



Facts

prove the economy of

RUST-OLEUM

Apply Directly Over Sound Rusted Surfaces



Just scrape and wirebrush to remove rust scale and loose particles — then brush Rust-Oleum 769 Damp-Proof Red Primer directly over sound rusted surface.

Lasts Longer Applied Directly Over Rust

Sandblasting, chemical pre-cleaning and other costly preparation methods are not usually required. Rust-Oleum penetrates the rust to bare metal, incorporating the rust particles into the coating.



Many Colors, Including Aluminum, and White

Rust-Oleum finish coatings incorporate the same basic rust-inhibiting vehicle as Rust-Oleum 769 Damp-Proof Red Primer. They provide double protection and enable you to beautify as you protect.



Practical Answer to Your Rust-Producing Conditions



Rust-Oleum resists rain, snow, heat, fumes, sun, salt water, and chemicals. So easy to use by brush, dip, or spray that one man often does the work of two.

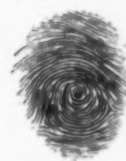
Proved Throughout Industry for Over 25 Years



Indoors and out, Rust-Oleum has proved its capacity to stop rust! Rust-Oleum can do the same for your tanks, metal sash, stacks, girders, roofs, buildings, machinery, pipes, etc.

An Exclusive Formula

Rust-Oleum is distinctive as your fingerprint. It incorporates a specially-processed fish oil vehicle that dries, is odor-free, and is formulated in many colors. Specify Rust-Oleum — accept no substitutes.



There Is Only One Rust-Oleum



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STOPS RUST!

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At Panther Coal Company... **Belt reinforced with "Cordura" rayon troughs better... has minimum stretch**

Reinforced with Du Pont "Cordura," this belt operates at 275 feet per minute. Driven by a 25-horsepower motor, it carries some 107 tons per hour. During its operation it has never been necessary to stop it for taking-up or other repairs.

According to engineers at Panther Coal Company's Maryhill, West Virginia, mine, the 30" slope belt pictured above trains perfectly and has not stretched enough to be noticeable. It was manufactured by Goodyear Tire & Rubber Company on a 4-ply carcass of Du Pont "Cordura" High Tenacity Rayon.

Here's the simple reason why belts reinforced with "Cordura" train better under all operating conditions. Man-made "Cordura" rayon yarn is inherently stronger than yarn of natural fibers. This permits a thinner... yet stronger... belt, with fewer plies. *Greater strength with less bulk.* These thinner belts are naturally more flexible, sit more snugly on the center idler—and thus have better troughability.

Also "Cordura" has the added advantage of making the belt relatively stretch-free. Find out about belts reinforced with Du Pont "Cordura." We'll be glad to send you the names of suppliers... together with full information about "Cordura" rayon. Just write for your **FREE** copy of the booklet "Sinews for Industry" to: Textile Fibers Dept., Room 4421C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

REG. U. S. PAT. OFF.

Du Pont *"Cordura"* High Tenacity Rayon
STRENGTH AT LOW COST



BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY



"Sinclair Lubricants Cut DOWNTIME"

... says Lone Star Steel Company



Coking coal used to process steel for the Lone Star Steel Company is mined at the company's own modern, mechanized mines in McAlester and McCurtain, Oklahoma. Their coal mining machinery is protected in its rugged every day operation by 5 selected Sinclair Lubricants.

Mr. Campbell R. Cameron, General Superintendent of Coal Mines, says, "Sinclair Lubricants give thorough lubrication . . . with minimum wear . . . and maximum runs between overhauls. The result is . . . considerable savings in maintenance costs, *less downtime* and less replacements needed."

In addition, the simplified lubrication procedure set up by Sinclair Lubrication Engineers has enabled Lone Star to cut lubricant expenditures by minimizing waste.

Invite a Sinclair Lubrication Engineer to consult with your Maintenance Superintendent. Call your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR LUBRICANTS

McCarthy drills

CUT DRILLING COSTS

BLAST HOLE DRILLS

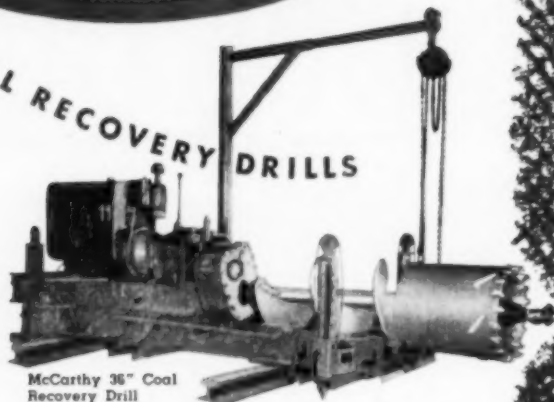
At Bessemer Limestone and Cement Co., Bessemer, Pa., one McCarthy Blast Hole Drill, like the one pictured below, averaged 90 ft. an hour, working through a hard blue shale facing 34 ft. deep. Holes were drilled on 18 ft. centers. Two men handled the whole job, including set-up and moving. Bessemer officials were so pleased with the performance of the McCarthy Drill that a second one was ordered and put to work in another section of their quarry. It, too, is breaking all previous records for fast, low-cost shot hole drilling.

**Heavy
Rugged
Powerful**

McCarthy
Model 106 Vertical Drill



COAL RECOVERY DRILLS

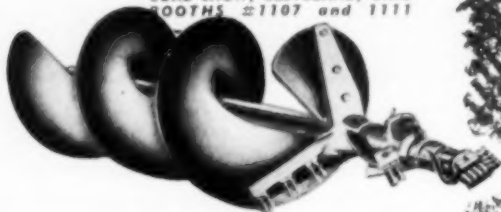


McCarthy 36" Coal
Recovery Drill

Near Salineville, Ohio, a three-man crew, operating a McCarthy Coal Recovery Drill, similar to the one shown above, produced 90 tons of clean, high-grade and profitable coal in one eight-hour day. At Germano, Ohio, a three-man crew, using a 36" diameter auger section, produced 167 tons of coal in one eight-hour day!

Hydraulically controlled and operating on gasoline, diesel or electric power, rugged McCarthy Coal Recovery Drills produce coal at \$1.50 to \$2.00 a ton, including amortization of investment cost. You can select from four models . . . 20" to 24", 30" to 36", 42" and 48" diameters with 4-ft. to 24-ft. auger sections. Write Salem Tool direct and a distributor will call on you.

VISIT WITH US AT THE
COAL SHOW, CLEVELAND, OHIO
BOOTHS 1107 and 1111



THE SALEM TOOL COMPANY

763 S. ELLSWORTH AVE.

Self-propelled high-wall Blast Hole Drill

SALEM, OHIO, U. S. A.

24" Coal Recovery Drill



SPIRATUBE-M®



Simplify mine and tunnel ventilation

Here's the airduct that can take it! Now you can deliver air to the working face of mine or tunnel — cheaper! That's because SPIRATUBE-M is built to cut maintenance costs! Ease of handling reduces installation costs. Unique SPIRATUBE-M construction features minimize leaks and seepage. And you get the maximum efficiency of your blower or fan . . . cutting power costs!

Immediately available in diameters to 30 inches, from fully-stocked distributors, SPIRATUBE-M is made in tough high count fabrics, all specially treated and heavily coated inside and out to withstand fungus, mildew and rough treatment.

And, patented, *built-in*, quick-couplers eliminate the need for separate parts . . . no need to look for couplers when you're in a hurry.

For heavy duty, pressure ventilation tubing without wire reinforcement, ask for AYRTUBE®. Sold in diameters to 36", AYRTUBE by itself or in combination with SPIRATUBE-M offers you an inexpensive airducting.

Check these features:



Handling ease

Lightweight

Flexible

Easily installed
by you

Takes sharp
turns without
crimping

Withstands fungus,
mildew, rough treatment



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FREE BOOKLET DESCRIBES SPIRATUBE-M and AYRTUBE MINING AND CONSTRUCTION APPLICATIONS. Write for your copy today.

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Company _____

Address _____

City _____ State _____

POWER SAVINGS

just begin to tell how

KENNAMETAL

Reduces Cutting Costs!



"At Moore Coal Co., Devonis, Tenn., 74 Kennametal Bits cut 2,400 places. Power tests showed Kennametal did the job on 75% of motor's rated load."



"Each set of Kennametal Bits was good for 100 places at Vinton Coal & Coke Co., Vintondale, Pa. Mine officials estimate that Kennametal saves them 5c per ton."

High power consumption at the face usually points to other excessive costs — in bit sharpening, bit changing, and machine down-time due to armature burn-outs and mechanical failures.

These costs have been minimized or eliminated in mines using Kennametal. Tough Kennametal Bits require less power because they stay sharp longer — hard Kennametal tips resist shock and wear better than any other tungsten carbide in the industry.

Substantially reduced cutting costs are the result—machines operate faster, free of strain caused by dull bits; more places are cut per shift; there are big savings in bit sharpening, maintenance, and parts replacements. Mine records show that Kennametal's bit cost per ton is 65% lower than other carbides.

Kennametal Cutter Bits are available in 17 tip and shank designs to assure economical service in any cutting condition. They are sold by veteran mining men who can recommend and demonstrate the right bit for the job in *your* mine. Call your Kennametal man anytime, without obligation.

WORLD'S LARGEST MANUFACTURER OF TUNGSTEN CARBIDE

DRILL BITS, CUTTER BITS, ROOF BITS, ROCK BITS, STRIP BITS

KENNAMETAL®

KENNAMETAL INC., MINING TOOL DIVISION
BEDFORD, PA.

GENERAL OFFICES and MAIN PLANT at LATROBE, PA.

STYLE HFD
rotary drills
hard roof





Here are the FACTS on POWER SAVINGS

Power Problem

How do Kennametal (X) and steel bits (Y) compare?

Ans.: X = 37 H.P./place
Y = 52 H.P./place
X/Y = 37/52 x 100 = 71% (% power needed by X bit) or X bit uses 29% less power than Y bit.

Conditions	Tools		Reduction	Location	
	Steel	Kennametal		County	State
KWH Per Sq. Ft. of Kerf	0.0664	0.0490	26%	Raleigh Co.	W. Va.
Ave. Amp/Place*	329*	259	21%	Harrison Co.	W. Va.
Total KWH Consumed/2356 T.	494.4	420.3	15%	Mercer Co.	W. Va.
Ave. Amp/Place	175	80	56.5%	Muhlenberg Co.	Ky.
Gasoline to Develop Power	3bbl/week	2bbl/week	33.3%	Butler Co.	Pa.
KWH Per Ton	2.60	1.05	59.4%	Marion Co.	W. Va.
Ave. Amp/Place	200	175	12%	Kanawha Co.	W. Va.
KWH/Place	4.8	4.3	11%	Mercer Co.	W. Va.
KWH/Ton	.44	.25	43.2%	Raleigh Co.	W. Va.
HP/Place	51	37	29%	Anderson Co.	Tenn.

*Carbide-Tipped Bits

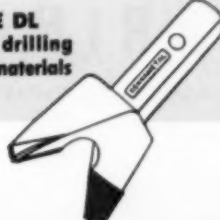
STYLE RD
rotary drills
medium roof



STYLE D
all purpose bit
for blast hole
drilling



STYLE DL
for faster drilling
in brittle materials



STYLE PT
drills roof too
hard for rotary
bits



**Above-average
efficiency . . .**

.. at no increase in cost

ROLLWAY **Tru-Rol** STEEL-CAGE BEARINGS

Normally you'd expect to pay a premium for the precision found in Rollway's TRU-ROL. Not so, however. These long-life steel-cage bearings are competitively priced. Their exceptional performance and low cost are the result of three distinctive Rollway advantages:

FIRST Advanced metallurgical facilities and mass production by modern, high-speed, high-precision machinery.

SECOND Experience since 1908—during good times and bad—in the practical application of cost-cutting methods.

THIRD Tru-Rol's contoured guide lips which insure constant roller alignment and extended life. They prevent undue wear caused by skew, slide and end-rub . . . encourage cooler operation by spreading a thin film of lubricant evenly over the rollers.



Our complete engineering and metallurgical services will gladly work with you on your problems. Simply write or wire any sales office. No cost. No obligation.

Rollway Bearing replacements are available through authorized bearing distributors in principal cities. Consult your classified 'phone directory.

ROLLWAY BEARING CO., INC.
SYRACUSE 4, N. Y.

ROLLWAY
BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

SALES OFFICES

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Chicago		Detroit
Philadelphia		Boston
Toronto	Pittsburgh	
	Los Angeles	

My Sweetheart's No Longer "A Mule in The Mine"...



IT'S THE RELIANCE TYPE 'T' HEAVY DUTY



*"The Toughest
Motor Ever Built!"*

Reliance Totally-enclosed, Non-ventilated, Explosion-proof Motor; one of several Reliance motor types especially developed for the mining industry. Reliance Type 'T' Motors are available in ratings from $\frac{1}{4}$ to 100 hp. to meet standards of the Bureau of Mines for use on "permissible" equipment. Low height and compact design satisfy space limitations of underground applications.

See
Precision Balancing of Rotors
... building longer life into
Reliance Motors
BOOTHS 1900-2001
CLEVELAND COAL SHOW
MAY 11-14



Write for Bulletin C-2001 describing the complete line of Reliance Type 'T' Motors through 1000 hp.

Wise operators nowadays provide their miners with dependable, economical Reliance Type 'T' Heavy Duty Motors. These rugged motors power 95% of all rubber-tired underground haulage . . . 70% of all coal loaders . . . and increasing numbers of other underground machines performing the toughest jobs in mining.

Type 'T' motors embody refinements developed by Reliance engineers working closely with users in the application of thousands of motors to the coal-mining industry. Especially designed, electrically and mechanically, for difficult underground jobs, Reliance motors have vital parts thoroughly protected against coal dust, moisture and other hazards encountered in the toughest mining jobs. They stay clean and dry...last longer with less maintenance. The next time you order new equipment, specify Reliance. See for yourself how these *tough* motors keep production up . . . and costs down. C-1446-A

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1055 Ivanhoe Road, Cleveland 10, Ohio • Sales Representatives in Principal Cities

STOP

COAL

DUST

*Effectively
and Economically*

● A Johnson-March system will provide the answer to *all* your dust problems. It will eliminate the dust explosion hazard, and assure your employees of added safety and better health by preventing dust from rising and mixing with the air. Johnson-March systems can be installed for application at the cutting face, on mining machines, loaders and continuous miners, at dumps or at the tipples. You



Coal being loaded in cars at a large West Virginia mine *without* Johnson-March treatment. Note excessive dust. Compare this unretouched photo with the picture below.



This unretouched photo shows the same operation with a Johnson-March system eliminating dust. These systems have proved themselves in hundreds of mines. We'll be glad to furnish names and addresses.

actually *stop coal dust* right at the source . . . before it becomes an airborne hazard.

Tests by the Bureau of Mines have shown that Johnson-March compounds added to water are **70% to 80% more effective in dust control than water alone.**

For more information on low-cost dust control in *your* mine, simply mail the attached coupon for this **FREE ILLUSTRATED BROCHURE.**



THE JOHNSON-MARCH CORP. CA-4
1724 Chestnut St., Philadelphia 3, Pa.

At no obligation, I'd like to know more about Johnson-March dust control in coal mines. Please send **FREE BROCHURE.**

NAME TITLE

COMPANY

ADDRESS

CITY STATE

Johnson March

Specialists in Dust Control

1724 CHESTNUT ST.

Philadelphia 3, Pa.

This Pump is Easy to Service

ALLIS-CHALMERS COAL WASHING PUMP

- All maintenance points are easy to reach.
- Can be taken down and returned to service in less than a half hour.
- Many parts interchangeable between different pump sizes.

Here's a pump that maintenance men like. The Allis-Chalmers coal washing pump is solidly built to stand rough coal washing service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers coal washing pump, replace a part and have it back in action again in less than a half hour. Piping need not be disturbed unless the casing is replaced.

COMPLETE PUMPING UNIT FURNISHED

This pump is equipped with *Texrope* V-belt drive and *Vari-Pitch* sheaves. Head and capacity can be varied instantly by the turn of a crank. Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive — assembled and ready to run.

GET THE COMPLETE STORY

Every Allis-Chalmers coal washing pump is application-engineered by a specialist who knows coal washing equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee, 1, Wisconsin and ask for Bulletin 52B6381.

A-3951

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

NOW

... even longer wear



Impeller and suction wear plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear . . . lower pumping costs.



ALLIS-CHALMERS



National Coils, National Maintenance Put Extra Performance into Mine Locomotives

The National Electric Coil Company "grew up" in the coal fields. Knows the problems which mine operators face; maintains two plants located and equipped specifically for mine service, and a third which contributes directly to speed and quality of our work for mines.

In these modern, completely equipped plants, specialists in *your* kind of motive power problems can do *everything* it takes to keep your mine locomotives running. Whether it's tire-tread rebuilding or complete locomotive overhaul, National can do it. If you need replacement coils, National is your best source.

National shop practices stress the little things which mean *extra-long life, extra-rugged performance*. National standards of quality and National engineering "know-how" mean that the motor you send in for rewinding or

rebuilding will come back as good as new, or *better*.

Fast pick-up service by National's own truck fleet helps you get out-of-service units back to work with minimum loss of time.

Your National field engineer knows your problems, he's there to help you keep your locomotives running. If you don't know him, drop a line to the nearest National plant—Harlan, Kentucky; Bluefield, West Virginia; or Columbus, Ohio.



NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.



ELECTRICAL ENGINEERS; MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES



One for all...

More and more midwest mines are realizing important savings through the versatility of SUPERLA Mine Lubricants. Inventories have been simplified and over-all lubrication costs reduced.

In one mine, a SUPERLA Mine Lubricant was adopted for use in main transmissions and gathering heads of Joy loaders and in the wheel bearings of coal cars as well. In over three years' operation, there has been no downtime because of scored clutch plates or faulty lubrication. In the cars, leakage of lubricant from bearing housings has been eliminated.

Also in this mine, a SUPERLA Mine Lubricant has provided trouble-free lubrication in the transmissions of Goodman loaders and in the gear cases of cutting machines. In more than three years of operation, there have been no cases of downtime of loaders or cutters due to faulty lubrication. Warm-up time for the loaders has been eliminated.

These are the big jobs, but the versatility of SUPERLA Mine Lubricants covers a wide range of applications from motor armature bearings to loading machine hydraulics. The chances are you can replace several special-

purpose lubricants with one or two SUPERLA Mine Lubricants and get better lubrication results in each case. There's a Standard Oil lubrication specialist located near you who knows mining equipment and who will work closely with you. To reach him, you need only call your local Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

SUPERLA

REG. U. S. PAT. OFF.

Mine Lubricants

STANDARD OIL COMPANY



(Indiana)

**"For branch lines I use a
half-hitch—pulled up tight**

"The detonating wave travels along the Primacord at about four miles per second. At that speed it must pass from the trunk line into each branch 'down-hole' line, where it detonates the charges.

"You can see why these branch connections are important—why they all have to be *tight* and at right angles to the trunk line. And that's where textile-covered Primacord has a big advantage. You can easily make these branch line connections with simple half hitch knots that can be drawn up tight and will stay that way."

Ask your explosives supplier or write
for further facts to

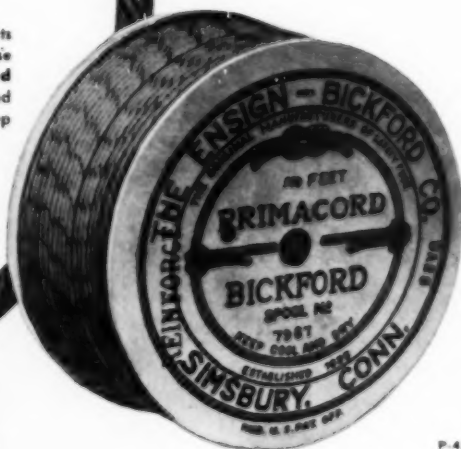
THE ENSIGN-BICKFORD COMPANY
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Also Safety Fuse Since 1836



Reinforced Primacord (for deep holes and resistance to abrasion) connects with the Plain Primacord trunk line with a simple half hitch, pulled up tight. The textile covering grips securely.

Use the brand of Primacord that meets your needs exactly. In addition to those mentioned, there are: **Wire Countered Primacord**, for deep, ragged holes; and **Plastic Reinforced Primacord**, for deep holes and unusual wet conditions.

Use **PRIMACORD**®



The PROVED and APPROVED DETONATING FUSE

APRIL, 1953

IVAN A. GIVEN, EDITOR

Emphasis Now

IS COAL DESTINED for a long period of operation at the low rates of 1952 and early 1953? Prognostication is always a somewhat chancy business, and is rendered even more difficult now by the tangled web of competitive relationships, weather, export outlook and consumer prejudices and preferences, to name but a few. Nevertheless, at least one clearcut fact emerges—the rising coal-burning capacity of the electric-utility industry.

Half Again in Five Years

Additional generating capacity to be installed by the utility industry, according to compilations by the *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate, represents—on a very conservative basis—a new coal-burning capacity of over 15,000,000 tons in 1953. Other increases for 1952 through 1955 raise the total to over 55,000,000 tons after 1955, bringing expected utility burn up to more than 160,000,000 tons in 1957, compared to 105,000,000 tons in 1952. And there is reason to believe that gains in other consuming areas in the relatively near future will add up to totals more than offsetting the losses that may be experienced, leading to the conclusion that the upturn, particularly in bituminous, could occur this year and quite likely will not be later than 1954.

The Job Ahead

In the light of this, what should industry policy be? Naturally, management in the front office and at the mines should continue its emphasis on getting a higher-quality product at a lower cost. Equally important is added stress on sales and service—engineering and otherwise. And finally, there are the industry programs of sales promotion, public relations and research, where the temptation is to cut when income is reduced in spite of the fact that logic dictates increased rather than reduced emphasis

in times such as these. These programs have produced results and will produce more with continued support at the proper level. Extra effort in these directions, even though it may seem burdensome at the moment, will pay off in extra dividends when the turn comes.

Backward Steps

THE POLITICAL POWERS now in the saddle in West Virginia, with the aid and support of the United Mine Workers of America, seem bent on setting up new and troublesome—if not downright dangerous—roadblocks in the way of coal mining. Among other things, their joint efforts resulted last month in a state Supreme Court ruling against the use of diesel locomotives underground. In this decision, the court followed the line laid down by the UMWA and its political supporters, including the present governor, who authored the interpretation of the mine law banning the diesel which the court has now accepted. This same governor, pleading in effect that he must have more money to achieve economy in state government, proposed a production tax on minerals, which of course would fall hardest on coal. Mr. Lewis endorsed it but fortunately the legislature was in no mood to follow.

Dangerous Precedents

In the diesel case, a major hazard is the establishment of a precedent under which the union—or any other organization or person—could effectively hamper the introduction of any new type of equipment—or the continued use of any present type of equipment. And if the union and the administration now in power in West Virginia had forced the production tax through and made it stick, the door might well have been opened for a series of arbitrary and burdensome levies. Those fighting these moves—and others of a similar nature that may come up—certainly should have any help the remainder of the industry can give.



POWER MADE FROM ATOMS may come from a "pile" like this one at Oak Ridge. The "fireman" is inserting fuel slugs.

Here's how to place your bets on . . .

Power From the Atom

With dollars and cents the big hurdle . . .

Commercial nuclear power is years away

Technology is tough and still has a long way to go

When nuclear power does come, it won't push coal out

DON'T WORRY ABOUT LOSING your electric-utility coal markets to atomic power. Not for a long time to come, anyhow.

The fact that a uranium pile a little over a year ago generated enough steam to make electricity to run some Atomic Energy Commission facilities at Arco, Idaho, for 24 hr doesn't mean you've got to count coal out. That

By W. A. STANBURY JR.
Associate Editor, *Coal Age*

plant generated about 100 kw. But it wasn't built to make electric power. It was built to test a "breeder" reactor and to experiment with heat exchangers and construction materials. Electricity was only a by-product. Nobody knows how much that electric power

cost because cost was not an object.

You can heat buildings with atomic energy, too. The British did it back in 1951. At their Harwell laboratories, an 80-office building was warmed with by-product heat from a large experimental atomic pile. That sounds pretty cozy until you learn that the reactor that provided the warmth cost \$20,000,000 or more. Not many

offices can afford that kind of heat. At Harwell, as at Arco, the by-product was gratifying; the cost, staggering.

Here's why coal men don't need to start worrying right away about electric power from nuclear fission:

1. Nuclear technology has a long way to go yet.

2. Until that technology is perfected, unsubsidized, atom-made power will have to sell for a lot more than power made from coal, gas, oil or falling water.

3. Even if nuclear power does become competitive sometime in the future, it won't take over suddenly. Utilities won't scrap their existing boiler plants and replace them with nuclear reactors without counting the cost of dollars already invested.

4. By the time nuclear power does become competitive, power demand in this country will be so great that all fuel producers, including coal men, may have to scratch hard to meet fuel needs.

That's not to say that nuclear-power research is a dead-end street. It isn't. Events at Arco and elsewhere show that scientists and engineers are making real progress in taming the atom. And it would be nonsense to think that some of the Nation's savviest corporations would go into nuclear-power research and development if they didn't see a better-than-even chance of coming out with something worth while.

But high cost remains the big obstacle. Until engineers bring costs down to a competitive level, atomic energy won't displace coal.

How Atoms Work

WHAT GOES ON in a nuclear reaction?

An atom is made up of protons and an equal number of electrons, plus a number of neutrons. Protons and neutrons together make up the atomic nucleus. The electrons whirl in orbits around the nucleus. The whole atom is much like a microscopic solar system. The number of protons in an atom nucleus determines what element the atom is—whether hydrogen or iron or cobalt or uranium. Protons carry a positive electrical charge; electrons a negative charge; neutrons, no charge at all. If neutrons aren't enclosed within the nucleus of an atom, they wander around in space at terrific speeds—terrific by ordinary standards, anyhow. There always are plenty of them flying around.

The simplest and lightest atom is the hydrogen atom. Its nucleus is one proton—that's all. When you add one neutron to this simple structure, you get heavy hydrogen, called deuterium.

Add two neutrons, and you get extra-heavy hydrogen, called tritium. Deuterium is easy to extract. It occurs in nature in a ratio of about 1 part of deuterium to 5,000 parts of normal hydrogen. But tritium is hard and extremely costly to make. The AEC is spending billions of dollars on the Savannah River project to make it.

Fuse heavy and extra-heavy hydrogen under terrific heat—in the order of 20,000,000 F, which is equal to or greater than the heat at the heart of the sun—and you turn hydrogen into helium. In fact, that's what does go on inside the sun. The helium nucleus resulting has two protons and two neutrons. Weigh an atom of this helium—or any helium, for that matter—and you'll see it weighs nearly 1% less than the two hydrogen atoms that fused to make it. The 1% that appears to be lost actually turned up as energy in that infinitesimal fraction of a second when fusion took place. That energy is what makes the hydrogen bomb—the H-bomb.

The H-bomb, unlike the uranium bomb, or A-bomb, can be as big or as small as you please. There's no "critical" mass to worry about. Also, unlike the A-bomb, physicists haven't yet found a way to control the reaction speed of the H-bomb. All they can get now is an explosion. Finally, the energy of the H-bomb comes from nuclear fusion, not nuclear fission.

If thus far we've spent time on the H-bomb and steered clear of the energy from uranium, it's because the H-bomb is easier to explain and throws some light on what happens with a uranium pile.

Now take a look at the A-bomb. It's the only heat source known that's hot enough to trigger the H-bomb. Any H-bomb therefore must include an A-bomb.

The A-bomb gets its explosive power from splitting rather than fusing atoms. Where the H-bomb uses hydrogen, the lightest element known, the A-bomb uses uranium, the heaviest natural element known.

There are two kinds of uranium—U-238, an atom of which contains 92 protons and 146 neutrons; and U-235, which also contains 92 protons but only 143 neutrons. U-235 is fissionable; U-238 isn't, and therefore is useless as an explosive. Both are isotopes of uranium; that is, they contain the same number of protons but different numbers of neutrons. Both occur together in nature. In a mass of refined uranium, you'll find 139 parts of U-238 to every one part of U-235.

To make the A-bomb, you need either pure U-235 or plutonium. (You'll find out more about plutonium

later, in that part of this article that tells about nuclear reactors.) The catch is, you've got to separate the U-235 from the U-238. That's what costs so much money at Oak Ridge.

If an atom of U-235 is bombarded with a neutron, it is split roughly into two halves. Each half contains about half of the protons from the original U-235 atom and therefore may turn out to be iron, zinc, barium, krypton or some other element whose weight is near the midpoint between hydrogen and uranium. These fission by-products and wastes are highly radioactive.

If, after splitting an atom of U-235, you gathered all the pieces of the original atom together and weighed them, you'd find they'd weigh only 99.9% of the original atom. The missing 0.1% was changed into energy and showed up as heat.

Every time you split a U-235 atom, you get more vagrant neutrons flying around at tremendous speeds. They bang into other U-235 atoms and split them, and release still more neutrons to split other U-235 atoms. If you bring enough U-235 together in one lump, you have what's called a "critical" mass; that is, there's enough of it to intercept so many fast-flying loose neutrons that most of the U-235 atoms in the lump are fissioned. Under those circumstances, the fission reproduces itself—that is, every million neutrons sent flying into space by fission create at least another million fissions. That's the chain reaction. The critical mass isn't big. It's about the size of a baseball. But the energy release, made up of that missing 0.1% instantaneously multiplied many millions of times, is violent and vast. It's the force that knocked out Hiroshima and Nagasaki.

How to Tame Atoms

THE SECRET OF MAKING HEAT by fissioning atoms of U-235 and then making steam and electric power from the heat lies in controlling the speed of progressive fission. That way, you can get heat in a slow, steady burn. You can do this by arranging masses or slugs of natural uranium fuel—a 139-to-1 mixture of U-238 and U-235—within the containing structure in such a way that the flying neutrons are slowed down. Slow-flying neutrons more easily penetrate not only the U-235 but also the more stable U-238. Graphite or some similar material, machined down to fine tolerances and pierced with holes that harbor the fuel slugs, is a satisfactory material for slowing the neutrons. It also prevents escape of neutrons from the reaction area and thus sustains the reaction until all or most of the U-235 is

consumed. The graphite structure, charged with uranium-fuel slugs, is called a "pile," or "reactor."

Three kinds of reactor (a reactor is simply an atomic furnace) will generate steam to make electric power. They are as follows:

1. Non-regenerative reactor—This uses U-235 only, or natural uranium heavily enriched with U-235, and discards U-238. In fact, it may use pure U-235, without any admixture of U-238. It produces heat to make steam. It probably will find its best use in military craft—submarines and airplanes—where cost doesn't count. There's no known or fancied way to make it competitive with coal.

2. Regenerative reactor—This produces not only heat but also radioactive fission products and some plutonium. Plutonium is a fissionable element which, like U-235, may be used for A-bombs or for generating heat. It results from the penetration of a U-238 nucleus by a slow-flying neutron. That way, the non-fissionable U-238 is converted first into neptunium. This neptunium, in about 24 hr, converts itself into plutonium. The plutonium in the reactor takes the place of the U-235 that is consumed in the reactor and thus the fissionable material in the reactor remains almost constant.

3. Breeder reactor—By control and conservation of the vagrant neutrons, a breeder reactor makes at least as much fissionable material as it burns up. You can burn this self-made fissionable material in its own reactor provided you haul it out of the reactor from time to time and separate it from radioactive wastes. Or you can send the excess elsewhere—if there is any excess—to start up another breeder reactor or to make atomic weapons. Thus, in the course of time, a number of power plants could be supplied with nuclear fuel without drawing down the Nation's uranium stockpile. The breeder reactor is the one that's absorbing the attention of physicists and engineers who hope to make cheap electric power from the atom. Conceivably, fuel cost could be zero—or nearly zero.

What About Fuel Costs?

MOST ELECTRIC GENERATING PLANTS do the following things: (1) convert raw fuel to heat; (2) make steam from the heat; (3) spin turbines with the steam; (4) turn generators with the turbines; and (5) draw off electric power from the generators. In this cycle fuel cost always is a big factor.

A hydroelectric plant substitutes falling water for Steps 1 and 2. Fall-

When the Atomic Energy Commission Moves In . . . Coal's Prospects Grow Brighter

How Coal Use Will Grow in Ohio and Tennessee Valleys

	Added Kilo- watts planned for 1956	Added Annual Coal Use in 1956*
PRIVATE PLANTS		
Primarily for AEC		
Electric Energy, Inc., Paducah, Ky.	500,000 125,000 110,000	1,600,000 400,000 352,000
Ohio Valley Electric Corp, Gallipolis, Ohio	1,000,000	3,200,000
Ohio Valley Electric Corp., Madison, Ind.	1,200,000	3,840,000
Affected by but not primarily for AEC		
Fifteen plants in Ohio Valley	1,400,000	4,480,000
GOVERNMENT PLANTS		
Primarily for AEC: TVA, Shawnee, Ky.		
	500,000 625,000	1,600,000 2,010,000
Mostly for AEC: TVA, other steam plants	5,500,000	17,600,000
Total	10,960,000	35,082,000

* Estimated: 3,200 tons per 1,000 kw.

ing water costs nothing. But dams, raceways and other facilities for directing the falling water over turbines cost a great deal.

A nuclear power plant would be much like a hydro plant. That is, the fuel cost might be negligible, but the facilities for converting raw energy to useful energy, plus other facilities, would be fantastically costly. There's the barrier to nuclear power.

The non-regenerative reactor, of course, is out of the question. It's safe to assume that it would burn up only half of the U-235 fuel. At this rate of efficiency, a 20-lb slug of uranium fuel, with U-238 and U-235 in the ratio of 139 to 1, would be equal to 90 tons of coal or 180,000 kw-hr of electricity. Under these conditions, engineers estimate that fuel cost would be 7 mills per kilowatt-hour. In contrast, a fuel cost of 2 to 3.5 mills is a safe figure for coal. For a 200,000-kw station, annual nuclear-fuel needs would be 77 tons of purified uranium. This nuclear power from a non-regenerative reactor can't hope to compete with coal-made power even in fuel costs, to say nothing of the cost of plant and facilities.

In a regenerative reactor, it's safe to say that anywhere between 1 and 3.5% of the purified mixture of U-238 and U-235 would be consumed, since some of the U-238 would be converted to plutonium. But if you run the rate up as high as 3.5%, you complicate the problems of separating and refining fission products so much that you offset burning-efficiency gains. So it may be better to stick to 1% con-

sumption of the fuel slug. At that rate, a 20-lb slug of fuel would provide energy equal to 260 tons of coal, or 520,000 kw-hr of electricity, with fuel cost at about 1.3 mills per kilowatt-hour. Savings in fuel cost, compared with the cost of coal, would permit you to invest up to some \$46,000,000 in a reactor for a 200,000-kw station. That's about \$230 per kilowatt. Annual fuel requirements would be 27 tons of uranium.

In a breeder reactor, it's theoretically possible to burn up all the U-235 and convert all the U-238 into fission products, including plutonium, and at the same time release 140 times as much energy as when U-235 only is consumed. Here, the heat from a 20-lb fuel slug would equal 26,000 tons of coal, or 52,000,000 kw-hr of electric power. Fuel costs then would be only 0.013 mills per kilowatt-hour. Annual fuel needs would be 0.27 tons. Fuel savings would justify investment of some \$60,000,000 in a nuclear reactor for a 200,000-kw steam station—that is, about \$300 per kilowatt.

Take it another way: For the sake of argument, assume that coal costs as much as 4 mills per kilowatt-hour of electricity produced and that atomic fuel costs nothing. That's a saving of 4 mills. Using that figure and a fixed-charge rate of 15%, *Power* magazine explains that you could justify an excess investment of \$230 per kilowatt of capacity if your nuclear plant ran at 100% load factor; \$115 at 50% load factor. It's very doubtful, *Power* argues, that you could squeeze

a breeder reactor and its essential associated facilities into that dollar-and-cents limit—not for some decades to come, anyhow.

Besides saving money on fuel, the breeder reactor makes plutonium which, as pointed out, is as good as U-235 for making A-bombs. As long as the United States and the Soviet Union keep on jockeying for positions of power, our government doubtless will buy all the plutonium it can find—and probably at a fancy price. Thus the sale of plutonium would have the effect of a substantial subsidy for a nuclear power plant.

In short, in regenerative and breeder reactors raw energy is practically free, like solar power, wind, waves and the tides. But nuclear energy may stumble exactly where other free energy sources stumble—the cost of taming them.

Where Costs Show Up

HERE'S WHERE THE BIG COSTS SHOW UP in making electric power from nuclear energy:

1. The reactor itself—The heart of the experimental breeder reactor that provided heat to generate steam to make power at AEC's Idaho plant is a small chamber or core about the size of a football. Here, in this small space, the nuclear chain reaction takes place and most of the heat is generated. Surrounding this core is a blanket of U-238. This blanket captures most of the vagrant neutrons, with the result that much of the U-238 is changed to plutonium. Within this reaction area, surrounded for safety by a thick concrete shield, the energy density is tremendous. Power density is 4 kw per cubic inch; heat release per cubic foot per hour, 23,500,000 Btu. This is far greater than anything now found in conventional high-pressure naval boilers. It gives you some notion of the tangled and costly engineering problems involved. The heat-transfer rate must be extremely high. And that's why the cost of a reactor installation must be determined in great degree by the equipment outside the chain-reacting unit.

2. Heat exchangers—High heat-transfer rates and the resulting thermal stresses load a tremendous burden on coolants and on pipes, valves, fittings and seals. In addition, the coolant is poisonously radioactive and subjects equipment to degeneration and corrosion. If the coolant leaks, it's a hazard to operating personnel. Precautions therefore must be elaborate—and costly.

The Idaho reactor uses an alloy of potassium and sodium metal as a coolant. The coolant, flowing through the

blanket and the core, becomes hot thermally and radioactively. It passes through a heat exchanger, goes to a receiver tank and is pumped upward by a special electromagnetic pump to a storage tank, whence it is recirculated to the reactor. The entire circuit is radioactive and must be shielded carefully. Another closed circuit of potassium and sodium alloy, not radioactive, picks up the heat from the exchanger and transfers it to a steam generator and superheater.

3. Chemical processing—From a breeder reactor, as pointed out, you get some plutonium and other radioactive fission products, gases, liquids and solids. The chemical and metallurgical manipulations needed to draw out plutonium and separate other fission products into useful or disposable forms are fantastically costly. But you've got to build a plant to do this job either on the reactor site or in a central location where it will serve several reactors. The chemical plant would add substantially to the investment in a nuclear power plant—from 30 to 50% of total cost would be for the chemical plant. *Nucleonics* magazine estimates the cost at \$10,000,000 minimum.

4. Waste disposal—Somehow, you've got to get rid of radioactive wastes. That's not easy. Eventually, of course, radioactivity exhausts itself or sinks below the danger level. That may take anywhere from a few seconds or hours to thousands of years. Meanwhile, though, radioactive materials are dangerous. Try to find ways to seal them, transport them and bury or sink them, with reasonable assurance that nobody in 3950 A.D. will stumble across them and get burned, and you begin to see the magnitude of the problem and the costs involved. The answer may cost far more than handling coal and ashes at a conventional steam station.

5. Plant site—The "exclusion" area for a nuclear power plant and its companion facilities must be vastly larger than that of a conventional power plant because the reactor creates radioactivity. W. L. Cisler, president, Detroit Edison Co., explains that a conventional power plant needs only 100 acres or so but that a nuclear-reactor plant might require 100,000 acres. Investment in land and the cost of security policing therefore must be substantial.

6. Safety—Keith Glennan, until recently a member of the AEC, warns that the atomic business is potentially one of the most dangerous in the world. In practice, however, it now is one of the safest. It's safe because the AEC has had money to spend to make it that way. But the cost of heavy

shielding, remote-control handling equipment, television monitoring, protective clothing, safety packaging and other protective equipment, materials and design must have added considerably to cost.

Can Costs Be Offset?

THE ADDED COST of a nuclear reactor, compared with that of a conventional-fuel steam generator, can be offset to some extent by the sale of fission products.

Plutonium would be the primary fission product. With the United States and Russia vying for top place in armed strength, the AEC or the Department of Defense doubtless would buy all the plutonium turned out by breeder reactors in electric-power plants. That, as pointed out, would be a subsidy—and a subsidy no one could reasonably quarrel with as long as we need atomic weapons. But suppose, 5 or 10 or 20 yr from now, we reach an understanding with the Russian Communists or a successor government. Need for the bomb then might vanish and the subsidy would be an intolerable tax burden.

As for other fission products, uses are being found in increasing volume, as the accompanying table shows. Sir John Cockcroft, of the British Atomic Energy Research Laboratory at Harwell, states that stations developing 1,000,000,000 kw of electric power would produce in one year radioactive fission products having a total of 100,000,000 curies. But whether markets for these products ever will grow big enough to absorb production is questionable. Certainly, at this time, the outlook isn't firm enough to justify a go-ahead on this basis alone.

Problems Still Unsolved

MANY TECHNOLOGICAL PROBLEMS, quite apart from the question of dollars-and-cents economy, still plague the scientists and engineers. These problems involve the construction, operation and utilization of nuclear reactors. Here are the puzzles:

1. Heat-transfer materials and systems—Reactor temperatures, according to Dr. W. H. Zinn, director, Argonne National Laboratory of AEC, need not be fantastically high. Useful coolants appear to be gas, pressurized water and liquid metals. The potassium-sodium alloy used in the Idaho experimental breeder reactor is liquid at room temperature and boils at 1,500 F. But the Idaho technique admittedly is not the final answer, and other coolants are under study and experimentation.

2. Construction materials—The big

question here is stability under intense irradiation, Dr. Zinn says. Physicists and technicians are broadening their research into such materials as zirconium, beryllium and graphite. There's a long road ahead on corrosion problems.

3. Chemical processing—Cheap, efficient processes haven't yet been found for recovering fissionable material—plutonium, that is—and other radioactive fission products from the reactor, though improvements thus far have substantially reduced the quantity of liquid wastes that must be stored. Further improvements, along with dollar savings, must be sought.

4. Safety—Sir John Cockcroft has spoken of the need for developing better designs and operating techniques that will provide still greater safety for workers and neighbors.

5. Waste disposal—You can't erase radioactivity. Thus far, no satisfactory system has been found for getting rid of radioactive wastes. A solution must be found.

Who's Busy Now?

SOME OF THE BIGGEST AND BEST corporations in the Nation now are busy with studies of nuclear power, in spite of the somewhat grim cost outlook. Doubtless they hope to achieve much the same thing the aluminum industry, for example, has achieved over a long time. Sixty-five years ago, aluminum sold for \$8 per pound. Today's price is 20c. With the same aim—that is, determining feasibility and getting cost down—they're working under contract with AEC.

One of the first corporations to move into the field was General Electric Co. Early in 1950 that company started studies on an engineering design and cost estimate for a power-producing breeder reactor. Some results of that study doubtless showed up in AEC's Idaho plant a little more than a year ago. GE still is in the atomic-research business.

Within the last 2 yr, other companies have taken the plunge. Here are the corporations, made up into teams, that took shape from 1 to 2 yr ago:

1. Detroit Edison Co. and Dow Chemical Co.

2. Commonwealth Edison Co., Chicago, and Public Service Co. of Northern Illinois.

3. Monsanto Chemical Co. and Union Electric Co.

4. Pacific Gas & Electric Co. and Bechtel Corp.

In addition to these four teams, which are closely related to AEC through contract, Walter Kidde &

How Radioactive Fission Products Can Be Used

Application

Market per Year

Technology Well Developed:

1. Activation of phosphors for luminescent pigments—highway markers, outdoor advertising and similar uses.

Tens of thousands of curies at \$50 per curie.

2. Static eliminators—Ionization of air in textile, printing, plastic and rubber industries.

Thousands of curies at \$100 per curie.

3. Fluorescent light tubes, permanently ionized, with faster starting and lower starting voltages.

Hundreds of curies at \$100 per curie.

4. Instruments containing radiation sources, such as thickness gages and markers for two products traveling in the same pipe line.

Hundreds of curies at \$100 per curie.

Technology Partly Developed—Ready in 2 to 3 Yr:

1. Industrial radiography.

Hundreds of thousands of curies at \$5 to \$50 per curie.

2. Cold sterilization for drugs, medical supplies and foods.

Hundreds of millions of curies at 1c to \$2 per curie.

Technology Undeveloped—Ready in 5 Yr or More:

1. Portable low-level power source.

Up to 365 kv—but at a power level measured in milliwatts—has been obtained by direct conversion of nuclear to electric energy. Only basic facts known.

2. Surface sterilization of fruits and vegetables.

Source: *Nucleonics*, Jan., 1952.

Co., Inc., last April announced its intention of setting up the first privately financed laboratories for research in nuclear power. At that time, the company hoped eventually to build a 100,000-kw station that would cost between \$10,000,000 and \$15,000,000. "No one can build a nuclear power plant for this price yet, but we are hopeful," said Dr. Karl Cohen, director of the Kidde project.

Under their contracts with AEC, the four teams listed above agreed to direct their studies toward:

1. The engineering feasibility of designing, constructing and operating a materials- and power-producing reactor.

2. Economic and technical aspects of building such a reactor within the next few years.

3. Research and development needed before such a project can be undertaken.

4. Recommendations concerning a reactor project and industry's role in such a project.

Already, those studies are bearing fruit.

Early in May, 1952, the Detroit

Edison-Dow team handed up an interim report marking the end of the first phase of its studies and put up \$250,000 to continue studies into a second phase. The interim report expressed a cautious optimism that technical and cost problems eventually would be solved. Under the AEC contract covering the second phase of this group's research, AEC authorized 11 additional companies to join the group. These companies are Cincinnati Gas & Electric Co., Cleveland Electric Illuminating Co., Consolidated Edison Co. of New York, Consumers Power Co., General Public Utilities Corp., New England Electric System, Philadelphia Electric Co., Public Service Electric & Gas Co. of New Jersey, Toledo Edison Co., Vitro Corp. and Wisconsin Electric Power Co.

Second-phase studies of the Detroit Edison-Dow group will seek to develop technology for an experimental high-temperature breeder reactor that will produce by-products, including plutonium, for sale to the government, as well as electric power. Phase 2 should be finished within a year.

Third-phase work, not yet undertaken, will aim at building a full-size experimental plant, according to Walker L. Cisler, Detroit Edison president. The reactor for this plant, he states, should meet the following specifications:

1. Use low-cost fuel.
2. Have a high breeding gain.
3. Be a high-temperature installation.
4. Be equipped to process by-products.
5. Require minimum exclusion area.
6. Have a simple set-up for fuel fabrication and loading.
7. Be inherently self-regulating.

Actual construction of such a plant may be several years off, the Detroit Edison-Dow group thinks. But when it's built, the group hopes to do it with private funds. In that event, Congress will have to change the Atomic Energy Act, which now forbids private firms to own nuclear reactors.

In October, 1952, the Commonwealth Edison-Public Service team announced that it had evolved a plan for building a power-and-plutonium reactor without changes in the Atomic Energy Act and without going beyond its proper sphere as a regulated public utility. The group suggested that the AEC pay for and own the reactor and provide the nuclear fuel and that the utility pay for and own the conventional power-generating facilities. Heat exchangers and other intermediate facilities would be built with government grants-in-aid. The AEC would dispose of all fuel elements after irradiation. The utility would credit the government with any savings below the cost of conventional electric power toward the purchase of any plutonium made in the reactor. The government would guarantee the utility against loss if the reactor failed to work and if nuclear fuel should not be available. The group explains that a public utility has no risk capital as such and that, since investment would come high, federal subsidy is required.

The Monsanto-Union Electric group, which also has made its first-phase report to AEC, predicts that electric power will be produced from the atom on a full-scale basis within 4 to 5 yr. The group recommends that the government design and build a pilot plant in the near future.

The Pacific Gas-Bechtel team has proposed, in substance, that the government assume all the abnormal risks of building a nuclear power plant and that the utility assume those risks that are normal to utility operation.

Where will such a plant be built? Nobody knows yet. But Dr. Law-

rence R. Hafstad, director of reactor development, AEC, told a Senate group last October that at least four factors would govern selection of a site. Those factors are the price at which atom-made electric power would have to sell to be competitive, the construction-cost index prevailing in the area, the availability of cooling water and strategic safety in the event of enemy attack. "Pick out the areas where power costs are high," he said. "That excludes coal- and oil-bearing regions." He admitted that a site near Eureka, Nev., appeared to be "high on the list."

What's the Outlook?

MOST OF THE PEOPLE involved agree that electric power can be made from atomic fission. They don't agree about when or how it can be made economically or how to finance it.

The President's Materials Policy Commission reported its conclusions a few months ago. Predicting power demand of 1,400 billion kw-hr by 1975 against 400 billion in 1950, the report said: "At this time, it does not appear that nuclear fission can be regarded as a contribution in any substantial degree to electric generation during the next 10 or 15 yr, and the probability is that the atomic-energy industry will remain a heavy net consumer of electricity." The tremendous power demands of existing atomic-energy installations at places like Hanford, Oak Ridge and Aiken, plus the needs of AEC plants still being built near Paducah and Portsmouth, would seem to bear out the PMPC prediction.

As Mr. Cisler sees it, atomic fission "as a source of heat energy alone is unlikely to be commercially successful in the foreseeable future without assurance of additional revenue from the sale of atomic by-product materials like plutonium."

Power magazine argues that the earliest examples of truly self-supporting or unsubsidized nuclear power plants may be very large central stations supplying electrochemical plants at high load factor, located near markets or raw materials in places where coal is costly—very likely in remote countries. A commercial nuclear power plant, operated without subsidy, is at least 10 and probably 20 yr hence, the magazine says.

But it may be Dr. Zinn, of our AEC, who has put his finger on the real outlook for nuclear power. He says: "Eventually, vast quantities of nuclear power will be provided at competitive cost, though perhaps not at cheaper cost. But such plants may satisfy our growing appetite for elec-

tric power." Dr. Zinn's view is shared by Sir John Cockcroft who, speaking of Great Britain's desperate need for more power to raise industrial productivity, recently stated the aims of the British Atomic Energy Research Laboratory. Sir John put it this way:

"We do not expect to produce a cheaper source of power than that derived from coal. It is likely, in fact, to be somewhat more expensive. What we are trying to do is to increase the total power available."

There may lie the future of atom-made electric power—in the burgeoning demand for more electric power throughout the world, and especially in the United States. Already, electricity is so cheap that it's no longer a major cost item in many industrial operations. Even at twice the price, it still would be dirt cheap. And as long as it stays cheap, there's not likely to be any slowdown in the growing demand for it. With hydro sites becoming scarcer, with oil and gas in doubtful supply a generation hence or earlier, and with power needs increasing, coal's role looks bigger in the years ahead even if atomic power does move into the picture in considerable quantity. However fast atomic power may grow, electric utilities aren't going to scrap their furnaces and boilers and replace them with nuclear reactors. They've got too much money tied up in conventional equipment. When nuclear reactors are built, they'll be built in new power plants. The older plants will keep on burning coal.

Those reasons probably are why Philip Sporn, president, American Gas & Electric Co., warned utility men last month that they must work both sides of the street from now on. Here's how he put it:

"There is no real question about the technical or mechanical feasibility of using nuclear energy to provide the fuel for electric power. The only serious question is whether nuclear energy can be produced cheaper than conventional power or at least at comparable cost."

Citing continuous mining, pipe-line transportation, low-temperature carbonization and underground gasification as examples of advancing coal technology, Mr. Sporn continued:

"While we are pursuing the opportunities for reducing fuel costs by resorting to nuclear fuel, we must not overlook any promising opportunities for reducing conventional coal costs. There are such opportunities, and the technical problems that must be solved to realize them seem substantially less difficult and less costly than those confronting us with nuclear power."



◀ **JOE GRIES**, tire engineer, Shen-Penn Production Co., says:

“Stay with us for these seven pages and we’ll show you how we inspect, repair and maintain the tires for 80 heavy duty trucks, 90 service trucks and a fleet of passenger cars. We’ve got some tire-changing hints you might be able to use. And by keeping accurate records we continually learn new ways to control our tire costs.”

Keep 'Em Rolling On Good Tires

WHEN YOU HAVE ALMOST A MILLION DOLLARS INVESTED in tires alone you have to take definite steps to protect that investment by working to compress your per-hour tire cost into the smallest possible figure. As a base to work from, you can start with a figure that represents the average cost experience of predecessors in the same type of work, then you modify that figure according to what you find out from your own experience. Finally, you apply “gray matter” to the job of keeping the cost per hour under control and bringing it down, if possible.

Initial cost, repair charges, labor and supplies all are important, but it’s how they finally mesh in the cost-per-hour figure that really governs the tire-service set-up at large strip mines.

That’s the nub of the tire program at operations of the Shen-Penn Production Co., Shenandoah, Pa., and the Wadesville Production Co., near St. Clair, Pa., says C. W. Fair, secretary-treasurer of both companies, who briefed us in these matters. Both are subsidiaries of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa.

Operating on the principle that judicious spending is one way to cut costs, Shen-Penn has put up a shop at Pottsville where lacerated and bruised tires are repaired

according to the principles of best practice as learned from tire manufacturers. This is supplemented by a tire-change shop at each of the operations, Shen-Penn and Wadesville, where trucks come in for a quick change and where the tires are mounted and dismounted from their rims. Furthermore, an accurate life history of each tire on the property is on file in the offices at Shenandoah.

THE MEN FOR THE JOB

What kind of a staff do you need for a program like this? Here’s the Shen-Penn and Wadesville line-up. Joseph Gries, tire engineer on the Shen-Penn staff, oversees the program for both jobs. Much of his time is spent in the field checking operating conditions. But he also works at his desk, studying performance records, comparing tire histories, following costs and otherwise winnowing his records for useful information.

At the tire shop in Pottsville, Francis Hughes is in charge as shop foreman. Mr. Hughes brings to his job over 20 years’ experience in commercial tire-repair shops and he and three men keep the shop going two shifts a day. In addition, two men at each operation roam the workings checking inflation pressures and inspecting the



TIRE SURGERY—First you diagnose the ailment by inspecting the tire on a powered spreader; then you excise the injured portion back to solid rubber. Cutting is continued until the sides of the hole slope inward toward bottom at 45 deg.



CUSHION GUM and filler strip flesh out the injury to the original surface of the tire. The cushion gum is a binder between old and new rubber and the filler strip adds wearing qualities comparable to the original rubber.

How tire surgeons operate on a rubber carcass

tires and rims for signs of damage. Four men at Shen-Penn and two men at Wadesville work in the tire-change shops, two men per shift. That's 15 men, including Joe Gries and Francis Hughes, with the principal duty of keeping the Shen-Penn and Wadesville fleets rolling on good rubber.

Enough work on tires alone to keep 15 men busy? Let's see what they do, first at the tire repair shop at Pottsville, then in the field and at the office.

MAKING TIRE REPAIRS

The tire-repair shop is equipped to repair but not to recap all truck tires up to size 24.00x29, although the top size now used on haulage trucks is 18.00x33. Passenger-car tires to 7.00x15 are repaired and recapped. Repairs include section rebuilding, reinforcements and spot repairs, which are defined as follows:

1. A section rebuild is the tire surgery necessary to close a wound that penetrates through the tire, cutting all plies. Haulage-truck tires have 24 plies.

2. A reinforcement calls for partial replacement of plies that have been damaged while others are intact.

3. A spot repair calls for replacement of gouged-out rubber to rebuild the protecting cushion of rubber over the more vulnerable but as yet undamaged ply material.

A definite sequence of operations is followed in rebuilding one of these injuries. The steps are (1) assessment of the damage, (2) cutting, (3) buffing, (4) replacing plies and rubber and (5) curing.

The large tires are too heavy for manhandling, so the shop is equipped with a 1-ton electric hoist on a traveling monorail. In determining the extent of the damage, the tire is placed on an air-operated spreader. Steel grippers



THE FIRST STEP in replacing damaged plies is buffing inside to provide an effective cementing area, then . . .



REPAIR UNITS, each containing 12 plies, are prepared by peeling off the fabric backing and cutting to size.



NEXT, THE REPAIR UNIT is cemented into the casing with enough overlap to insure adequate reinforcement,



THE EDGES of the repair unit are sealed with cushion gum after air spaces under the patch have been rolled out.

How damaged plies are replaced to reinforce a tire injury



REBUILT SECTION is cured 4 hr in a heated mold to vulcanize inside and outside repair units to original rubber.



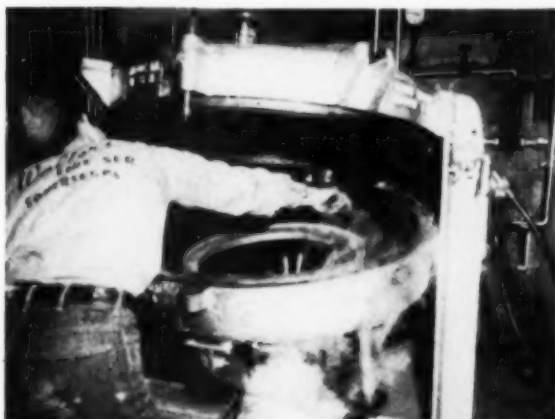
THE STEAM AIR BAG, which supported tire in mold, is removed and repaired section closely inspected.



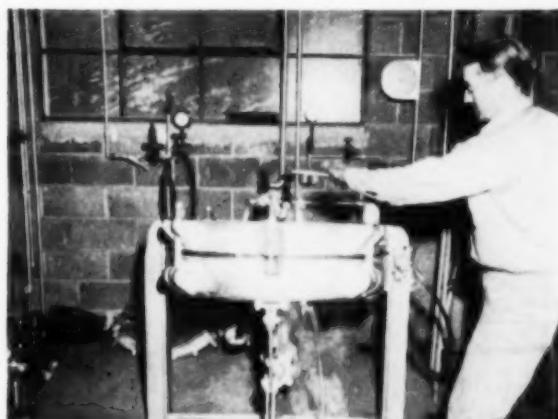
WIRE-BRUSH TRIMMING WHEEL scarfs rubber across tread to provide clean, rough cementing base for new cap.



CAMELBACK, the raw material for the new cap, is cut with 45-deg bevel at the joint and cemented around casing.



RECAPPING MOLD is lubricated to receive tire. Steam-heated mold (298 F) vulcanizes a cap in 1½ hr.



MOLD IS TIGHTENED and a reinforced tube inside the tire is inflated to 120 psi to form the tread under pressure.

How tires are recapped for P & R's fleet of company cars

on the spreader engage the sides of the tire at the bead, and as air is introduced the tire is spread apart for easier inside examination. The tire rests on rollers which are part of the spreader frame to permit revolution of the tire for an all-around inside inspection.

The injuries are circled in chalk during the inspection. Then the tire is hoisted out of the spreader and "cutting out" begins. As shown in the photos, the cutting always is done from the outside with a flexible knife and with grippers to lift the cut-out flaps of rubber. Cutting is continued until all traces of the original injury have been removed, and until the sides of the cut are beveled at about 45 deg.

Buffing, the next operation, consists of roughing-up and cleaning the inside surface of the tire in preparation for cementing a repair unit in place. Buffing is done in an enclosed room by a man in respirator and goggles who uses a wire wheel driven through a flexible shaft. All electrical facilities in the room are totally enclosed to prevent deposits of rubber from accumulating in such equipment and to eliminate fire hazards.

One of the most important considerations in tire repair-

ing is cleanliness. Dirt is the No. 1 enemy of successful tire repairing. Any oil, body perspiration, dust or other contamination that finds its way to the repair work in progress may result in separation. Therefore, every possible effort is made to maintain cleanliness of the shop and personnel at all times.

Now the tire is ready to receive the replacement materials: raw rubber and makeup ply units.

First the repair units are cemented over the buffed area inside the tire. The repair units contain the replacement plies, 12 plies to a unit. Therefore, a section repair requires two complete units to replace the 24 broken plies in one of the haulage-truck tires. In any event, the reinforcing unit placed inside the tire contains as many plies as have been broken by the original injury. The edges of the repair unit are sealed with cushion gum after possible air spaces have been eliminated by rolling out or "stitching" the unit. Section breaks as long as 20 in have been repaired, but repairs ordinarily are limited to those under 12 in.

On the outside, cushion gum and filler strip are laid into the cut-out recess. Each course of new rubber is



SPLIT RING AND RETAINING FLANGE are removed from rim to permit the tire to come off.



TIRE ASSEMBLY is dropped on shop-made anvil to break rim free of the grip of the tire. Anvil is a modified rim.



A CHAIN YOKE is placed around the exposed flange of the rim and connected to the hook of hoist through a chain sling. The hoist pulls out the rim against the dead weight of the tire. Jogging the hoist helps if the tire is tight on the rim.



Helpful hints for dismounting tires from rims



A LONG 1 1/2-IN PIPE, placed over a stud, prevents tire from falling as it is heaved off the hub and lifts tire to clear hub when it is heaved on the vehicle. Jogging the bottom of tire with pry bar makes reassembly easier.





SHEN-PENN TIRE REPAIR SHOP—In 1952, four men in this tidy shop (left) performed 2,348 tire repairs and 128 recaps to help keep 'em rolling. Compact stoker and boiler (right) provide steam for four curing molds and a recapper.

stitched to eliminate air pockets before the next course is added, and the hole is filled to the original surface of the tire.

The repaired sections of the tire now are ready for curing in the heated molds. A steam-air bag is inserted into the tire at the point of repair to support the tire in the curing mold and to provide a means for heating the inside.

The bag is made of woven-wire mesh imbedded in rubber to provide sufficient strength to hold steam or air at 90 psi while permitting limited expansion of the bag inside the tire. The bags are designed to be used with tires of specific size.

In the average section repair, the tire is in the mold for a period of 4 hr—2 hr on steam at 90 psi and 298 F and 2 hr on air at 90 psi in the steam-air bag. A reducing valve lowers steam pressure to 45 psi for heating the mold jacket outside the tire.

Steam for the four curing molds and a recapping unit is provided by a high-pressure boiler fired by an automatic stoker with a feed and combustion rating of 50 lb per hour, anthracite buckwheat. Coal consumption is about 2 tons of buckwheat per week.

The unit is monitored by automatic hold-fire controls for week ends and idle periods and with an automatic time control that shuts off high-pressure steam at a pre-set time. This permits a cure to be started near the end of the second shift and automatically stopped at the proper time during the night. Wilbur Wensel and Bill Sterner work the first shift with Mr. Hughes, and Paul Bervinchack takes over for the second shift.

Whether or not a tire is suitable for recapping is a decision made at the shop by Mr. Hughes, who says the carcass must be in A-1 condition before an investment will be made in a new cap. In other words, he is reasonably certain the tire will hold up long enough to wear out the new tread.

The practice of recapping is definitely controlled by the relation of recap cost per hour of service to the cost per hour of service obtained from the original tire, after making due allowance for remaining life in the original carcass at the time it is considered eligible for recapping. The volume of recapping fluctuates as each change occurs in the economics.

Truck tires are recapped by any of the several commercial recappers operating in the service area. Passenger-

car tires for the fleet of P&R and its two lusty subsidiaries are recapped in the shop, as shown in the photos. In some few instances, Mr. Hughes says, truck tires of nylon-ply construction have been recapped three times.

Here is a list of the work done in the shop in 1952:

Tire Size	Sectional Repairs			Reinforcements		Spots	Total capped
	4 to 6 in	6 to 9 in	Over 9 in	4 to 6 in	6 to 9 in		
18.00x32	16	24	4	52	48	92	236
18.00x24	44	48	52	148	96	224	612
16.00x24	60	80	16	108	24	296	584
16.00x25	12	28	12	56	8	68	184
14.00x24	28	16		72		60	176
Others	80	12		20		76	188
Passenger	172			56		140	368
TOTAL	412	208	84	512	176	956	2,348

Shop equipment includes four repair molds, the recapping machine, and a 5-cfm air compressor. Repair materials include vulcanizing cement, rubber solvent, cushion gum for binding new rubber to old, filler strip for wearing quality, repair units containing high-tensile cord, and camelback for small-tire recapping.

An essential feature of the shop is a drying room equipped with a heat blower to dry the tires prior to repairing them.

All tires are placed in the drying room for a 24-hr period at a temperature of 150 F. This prevents separation that might otherwise occur from moisture in the carcass.

During the last 2½ yr of operation of the repair shop, only the best available grades of material have been used. Cleanliness and workmanship have been maintained at the highest standards. This has resulted in a minimum of repair failures and substantial reduction in tire costs. In addition, the plant is located within a short distance of the stripping jobs and has enabled them to operate on a lesser investment in spare tires and without suffering equipment

down-time for lack of quick repairs in bad weather. This latter feature in itself justifies the investment made in the plant.

TIRE SERVICE IN THE FIELD

Here's the vehicle lineup at Shen-Penn, Wadesville and P&R: certainly enough units to warrant the full-time employment of 15 men to get the most out of tires. The spoil and coal haulage fleet consists of 46 15-yd and 14 19-yd trucks, all six-wheelers, and 20 20-yd trucks with 10 wheels. The 90 service trucks include field-service welding units, air compressors, pick-up trucks and so on. The passenger-car fleet consists of 56 cars.

As mentioned, two men patrol each operation with the mission of preventing tire damage before it occurs insofar as this is possible. They check inflation pressures, inspect for signs of damage, watch for rocks wedged between dual tires and advise operators as to what they should do when damage is found.

Next in the maintenance lineup comes the "bull gang"—the two men per shift who operate the tire-change shop at each operation. When a truck comes in with a flat or damaged tire, it is their duty to get it back into the active haulage train as quickly as possible. At the Shen-Penn shop, this observer saw the crew get a truck rolling 20 min after it had come in with a left-rear-inside flat. It takes teamwork, and since a mounted tire weighs almost a ton, it is not a job for frivolous practical jokers, Mr. Gries says.

In the event the damaged tire is on a rear wheel, the job of jacking is simplified because Shen-Penn's tire experts permit the truck to jack itself. Here's how:

An 8-ft-long 6x6-in jackpost is set upright on a footing under the lip at the rear of the dump body. The body is raised until it engages the top of the jackpost, then the men stand clear while continued operation of the dump mechanism lifts the rear wheel against the resistance of the jackpost. The raised end of the axle is blocked up, the dump mechanism is reversed to lower the axle onto the blocks and the jackpost is removed.

Each tire-change shop is equipped with a monorail hoist for moving the heavy rim-and-tire assemblies and with an air compressor for inflating the tires and operating the impact wrenches.

The stud nuts which secure the wheel to the hub are run off with the impact wrench and the retaining ring is removed. Then, with the waiting truck driver to help, the tire-change crew puts another Shen-Penn kink to work in removing the tire assembly.

The wheel is oriented with one of the studs at top dead center. The third man places one end of an 8-ft length of 1½-in pipe over the top-centered stud and supports the pipe horizontally from the other end. The two others, one on each side, slide the tire assembly off the hub onto the pipe. The pipe prevents the assembly from falling as it leaves the hub and it is rolled out of the way. The inside tire and rim of the dual pair is removed in like manner.

Replacement tire assemblies are returned to the hub by reversing the procedure. The unit is rolled into place in line with the hub, and then the pipe is placed over the top-centered stud and used as a lever to lift the assembly just high enough to clear and slide on as two others apply heave-ho at the sides. Jogging the tire at the bottom with a pry bar, as shown, eases the job of sliding the assembly into place. Spreaders, centering rings and retainers are replaced, the stud bolts are secured, and the truck takes off to get back to work.

Now the damaged tire is dismounted from the rim ready for shipment to the Pottsville repair shop, if that is

necessary, and Shen-Penn has some helpful hints for easier dismounting. Here's how it's done:

The split ring and flange are removed from the outside face of the rim. An anvil made from a scrap rim is placed on the floor, as shown in the photos. Then the tire is rolled into position and pushed over so that the rim in the tire strikes the anvil, the sudden jar breaking the bond between rim and tire.

Now the flanged side of the rim is uppermost. A chain yoke is placed under the flange and secured to the hook of the monorail hoist with a chain sling. Usually, the hoist will lift the rim out of the tire; but if the tire is particularly tight, you can jog the hoist and that will do the job. Presto! The tire lies flat on the floor while the rim hangs from the hoist.

In making the anvil, Shen-Penn welders cut out a piece and reweld the scrap rim to make a cylinder of smaller diameter than the original. That's to make it easy to remove the anvil if the tire should slide down over it. Panels are cut out of the midsection of the anvil to reduce its weight.

The normal reserve at the two operations is one mounted and inflated tire in the tire-change shop for every two trucks in service.

KEEPING TIRE RECORDS

As soon as a tire is purchased it is branded with a company number that will serve to identify it throughout its life. All records pertaining to a particular tire are keyed to this brand number.

Three records are of major importance. They are the truck operator's time card, the tire-change tag and the tire mileage or hours-of-service record.

Each operator submits a daily time report to his supervisor for payroll-makeup purposes. On this report he enters the fleet numbers of any trucks he has operated during the day and his hours on each truck. From this information, the clerical section maintains a running record of the hours of operation of each truck and every tire on each truck.

But how do you keep a running check on tire changes? You do it with tire-change tags. When a truck comes to the tire-change shop, a tag is filled out showing the brand numbers of the tire taken off, the tire put on and the wheel position where the change was made. At the end of the shift, all tags from both field shops are sent to the Shen-Penn offices where the clerical section transfers the information to the 8x5-in hours-of-operation record. Shen-Penn considers hours, not mileage, as a basis for tire-cost accounting.

An hours-of-operation card for each branded tire is kept up to date on the information contained in these field records and daily reports from the Pottsville tire-repair shop. Mr. Hughes reports the brand numbers of the tires repaired and the extent of the repairs. The cost of such repairs is entered against the tire on its own hours-of-operation record. Thus, at any time the service and cost history of any tire is as fresh as yesterday's reports and close at hand in the hours-of-operation record file.

The tire program at Shen-Penn and Wadesville is considered to be one of the functions of all officials up to and including F. W. Chesney, president. Assisting Mr. Chesney in keeping tire costs under control are Mr. Fair; Joseph Petusky, general superintendent; E. R. Ermert, chief engineer; and W. R. Kane, maintenance superintendent.

Furthermore, haulage roads are carefully maintained to prevent possible injury to tires, but road maintenance is another story.



GOOD CONVEYOR DESIGN backed up by good operation and proper maintenance, lay the groundwork for the maximum return from conveyor-belting investment.

How to Get Your Money's Worth Out of Your Belt Conveyors

Have you started with good conveyor design?

Do you operate them properly?

Do you insist on good maintenance?

By **CHARLES W. STAACKE**

Technical Adviser, Conveyor and Belting Sales, Hewitt-Robins, Inc.

WHAT IS the biggest single item in the cost of a belt conveyor? It is the belt itself, which represents from 40 to 60% of the total cost—even higher in the newer high-tension installations that are going into service. That is why I approach the subject of getting your money's worth out of belt conveyors from the angle that equipment design, operation and maintenance should be directed toward increasing the life of the belting. When we consider that belting cost has increased about 32% since 1948, attaining maximum life is even more important to cut the cost per ton of the material handled.

The things I am going to recommend do not have to be done to make a conveyor work. Conveyors can be thrown together with almost any kind of equipment. They can be abused and neglected and the belt will keep plodding along, running over idlers that haven't turned for years, dragging itself through accumulations of material that have buried the idlers that are supposed to carry it and make its running easy, and—even—cutting through wood or steel members in trying to do its work.

The moral is: Treat a belt right, and it will respond with increased life and service adding up to millions

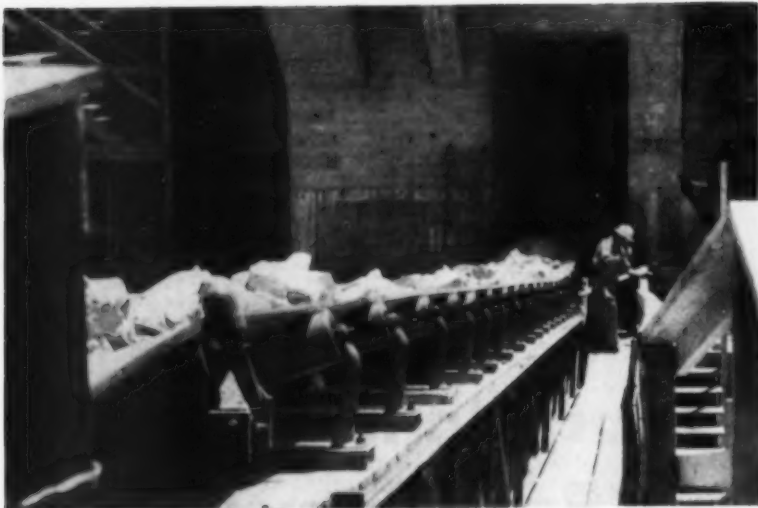
of tons. What are some of the things involved in treating it right?

CONVEYOR DRIVES

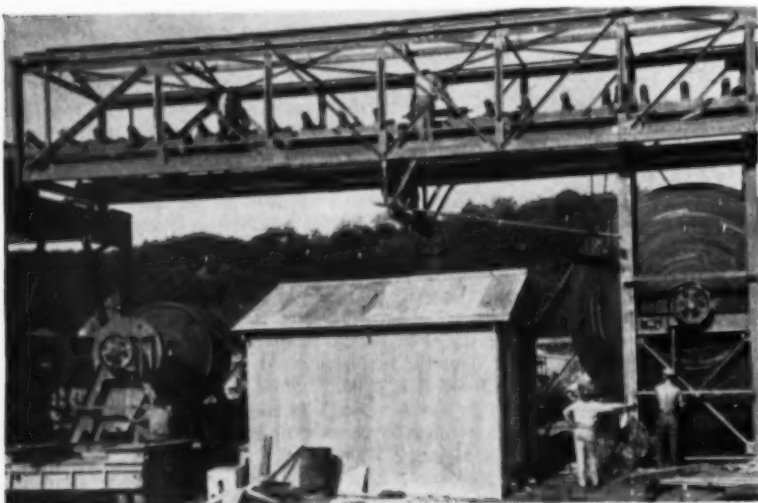
Single or Two-Pulley—Two-pulley drives include the tandem type, where the two pulleys are geared together and driven by a single motor, and the dual drive, with each pulley driven by its own motor.

A contact arc of 260 deg can be obtained with the single-pulley drive. With two pulleys, 440 deg—220 deg on each pulley—can be obtained. The increased contact arc increases the snubbing action between belt and pulley, permitting more power to be transmitted with less initial belt tension before slipping occurs. Hence, single drives are used on short conveyors, or long steeply inclined types. On a high-lift conveyor, the weight of the belt down the slope automatically results in a high slack-side tension, and this cannot be decreased by increasing the contact arc.

The proper application for the two-pulley drive is on long, level or near-



GOOD PRACTICES—Rubber-cushioned idlers under loading gates (top view) to absorb shock and protect belt; lower view, guide idler to prevent edge wear and protective deck over lower strand.



GOOD INSTALLATION—Left is a temporary track-mounted wind-up, next is temporary splicing shed with work table inside, and right a permanent wind-up that can store all belting for either of the two conveyors shown and also a third.

An Expert Tells You . . .

ly horizontal conveyors where the power transmitted is high. The increased contact arc permits this with very little slack-side tension.

With the single-pulley drive, don't skimp on contact arc because, theoretically, it isn't needed. Use 240 deg instead of the usual 180, 210 or 220. The additional safety factor prevents slippage. More important, the increased wrap will prevent slippage backward over the driving pulley when it is locked by the holdback.

Don't use a tandem drive on a two-pulley installation. Use a dual-motor drive. The speed of a belt going onto a driving pulley is greater, by a measurable amount, than the speed coming off. Hence, whether or not there is slip between the belt and driving pulley, there is creep because the belt recovers some of the stretch that occurred as it went onto the driving pulley under maximum tension. With the dual drive, the speed of the secondary pulley is automatically adjusted to the reduced belt speed. In the tandem drive, however, the speed of both pulleys is the same.

Motor Selection—In selecting a motor or motors for the belt drive, don't put in 200 hp, for example, to be on the safe side when calculations indicate that 100 hp will do the job. Belts have to be started and stopped. But don't do it any oftener than necessary, and after they are started don't have extra power putting extra starting stress into the belting. It doesn't help.

Conveyor Starting—Speaking of starting a conveyor, use some form of controlled starting wherever possible. Across-the-line starting is not conducive to long belt and splice life.

Lagging Drive Pulleys—Lagging should be done with top-quality grooved material. Lagging is expensive, but not as much as installation labor. Grooved lagging has these advantages:

1. It prevents slippage when belting is wet or frosty.
2. It prevents pulley wear.
3. It reduces the wear on itself resulting from the ever-present belt creep over the driving pulley.

Lagging should be bolted to the driving pulley, not vulcanized on. Vulcanizing should be used to put the lagging on if it were not for the fact that the lagging eventually must be replaced. Carrying spare lagged pulleys costs more than ordering new lagging when the old must be replaced. Sending pulleys back to the rubber company to be relagged consumes time and is expensive. If you

What to Do . . . and Not to Do . . . for the Best Results From Belt Conveyors

use bolted lagging, remember that there must be hand holes in the pulley ends to permit bolting. Self-tapping lag screws do not do a satisfactory job of attaching lagging to welded-steel pulleys.

CONVEYOR PULLEYS

I campaign for straight-faced, not crowned pulleys. Why distort a belt transversely as it travels over a pulley? Belting is recommended for certain working stresses per inch of width on the assumption that each inch of width is doing the same work. This isn't true with crowned pulleys. Crowned pulleys do not make a belt run straight. The carrying idlers steer the belt, with the help of a conveyor in perfect alignment.

Don't skimp on pulley widths, diameters, strengths or shaft sizes. Adding a few inches to width or diameter makes only a small difference in the final cost of the job, and can considerably increase the belt's chances of long, trouble-free service. Give your belts a chance to roam around a little. Too-close confinement can result in trouble.

A conveyor breakdown is serious in any plant. A broken shaft or pulley can mean costly shutdown time, as well as costly damage and additional delay as a result.

Belt tension and contact arc should determine pulley diameter. Therefore, the head, drive, tripper and any snub pulleys on the high-tension side should be the same diameter. The same applies to head or drive-snub, take-up and tail pulleys on the low-tension side.

Small Pulleys Shorten Life—Few present-day belts fail as a result of ply separation, which, theoretically, should occur with pulleys that are too small. But short splice life is frequent, particularly with metal lacing. Incidentally, soft lagging on pulleys promotes better splice performance.

A belt must distort going around a pulley. The outer plies are stretched and the inner plies compressed. The extent of distortion depends upon the thickness of the belt and the arc through which it is bent. Stretching of the outer plies can be distributed over a long or a short distance depending upon pulley diameter. You can leave off the pulley entirely and run the belt over the shaft, but there are some advocates of small pulleys that think this is going a little too far.

Put thick, high-grade, flexible grooved pulley lagging not only on the driving pulleys but also on any snub or bend pulleys which the dirty side of the belt contacts. This goes a long way toward making these pul-

leys self-cleaning, and there is no question about eliminating pulley wear.

When it comes to pulley bearings, it stands to reason that the more the frictional loss there is in the parts that must be moved by the running belt the more useless power the belt has to transmit. This should be sufficient reason for a preference for antifriction bearings.

CONVEYOR TAKE-UPS

Belting components—rubber and fabric—are, under even the most rigid controls, variable materials. Therefore, adequate means must be provided to compensate for length variations.

The gravity-type take-up with a total movement on centers equal to 2 to 3% of the center-to-center length of the conveyor provides these very necessary elements in successful conveyor-belt operation:

1. Movement to take care of initial stretch and following recovery as the belt is started, and which is apparent in the movement of the take-up pulley—first down and then up.

2. Compensation for the permanent stretch or shrinkage that occurs during belt life.

3. Storage space for spare belting that can be used if it is necessary to replace a vulcanized splice. Thus, repairs can be made, as a rule, without adding a belt section and having to make two splices instead of one.

4. Constant tension for the drive at all times.

As a general rule, locate gravity take-ups back of the belt drive. The exception is on long inclined conveyors where the weight of the belt down the slope provides all the slack-side tension at the drive pulley needed to prevent slipping. With slopes steeper than 14 deg, the take-up can be located at the tail pulley, thus eliminating extra pulleys and a lot of the counterweight usually required. With conveyors this steep, the slack that occurs back of the drive when the belt is started is dissipated down the slope without reducing the slack-side tension at the drive.

CONVEYOR FRAMES

As with pulley diameters, there is a definite tendency to skimp on the width of the conveyor frame. The next topic of discussion will be idlers and, like pulleys, they should be wide enough to let the belt roam around a little before it gets into trouble. If we widen idlers and pulleys, we have to have a wider conveyor frame for proper mounting of this equipment.

Few users realize that the conveyor industry provides what is called "standard" and "wide" spacing. My recommendation is wide spacing and then some more.

Some day, I hope to see conveyor frames designed so that the return idlers will be mounted on stands instead of the brackets now used. Stands will eliminate any chance of the belt edges rubbing against idler brackets. Stands will put the belting below the conveyor stringers and in full view of the conveyor patrolman at all times. Thus he can see whether it is running too far to one side or the other without standing on his head. Stands will permit the return belt strand to roam as far as the conveyor bents before it comes up against any obstruction.

Many belt men talk about damage from edges rubbing against obstructions. I've never heard one mention the tremendous power it takes to drag even a small stretch of belt along a stringer. The belt edges can take quite a bit of this abuse and still stay on. But the power required not only overloads the motors, it also overstresses the belt beyond its design limits.

In other words, design your belt-conveyor framework so that there is no chance for the belt to rub against anything, so that it can't get caught on something that will rip it or tear it in two, and so that the return strand can be seen to determine if it is tracking properly.

Eliminate Spillage—I've always been under the impression that conveyors were supposed to carry material from one point to another. However, I sometimes wonder if they aren't really used to distribute material from one end to the other—and I am not talking about a conveyor equipped with a traveling tripper.

There is no excuse for spillage from a belt conveyor except poor design, poor maintenance or overloading. Management still buys plants for a certain capacity and then demands twice the output as soon as they are put in operation. I do not expect to live long enough to see a change in this practice, so some consideration should be given to handling spillage.

I believe there should be decking between the top and bottom belt strands. It keeps spilled material off the bottom belt strand and out from under the conveyor. If it isn't used the entire length of the conveyor, it should at least be installed at the head end, over the take-up section, and under the loading point or points. In addition, wire netting should be placed around take-up sections or at

any point where a lump—or a man—might get between belt and pulley. A plow should be placed ahead of the tail pulley on the return strand to keep material from getting between belt and pulley at this point. I once saw a conveyor cut into two belt widths by a stone that bounced off a conveyor slope, opened a door, went down a flight of steps and finally lodged between a concrete foundation and the belt against one of the drive pulleys—ruining a \$10,000 belt in less than 2 min.

Like houses, conveyors should be built on a firm foundation. But I've seen lots of them on temporary frames and looking about as straight as a dog's hind leg in a short period of time. Even then, the belt will do a pretty good job of following the idlers, except on the return strand, where it seems to believe that the shortest distance between two points is a straight line. The result usually is belt edges running against brackets, stringers and other obstruction, with resultant edge damage.

TROUGHING IDLERS

A conservative estimate is that 99% of all the idlers now in service are of the dead-shaft type; that is, the rollers revolve around stationary shafts. The other 1% are live-shaft idlers, with the rollers attached to shafts which revolve in bearings in housings with self-aligning provisions. The housings also provide the small grease reservoirs needed.

To increase the life of idler bearings, reduce friction loss by reducing bearing speed. This can be done by going to live-shaft idlers and rollers—in a larger diameter. For long-life installations—20 or 30 yr or more—live-shaft idlers will more than pay for themselves in longer life and less maintenance, lubricant and belt tension. Higher belt speeds, increased belt loads and more operating hours per day are factors that some day will bring live-shaft idlers the acceptance they deserve.

Making Belts Run Straight—Whether you use live or dead shafts, there are some things that apply to idlers in general. Remember at least two: (1) they make the belting either run straight or off to one side or the other; (2) they support the weight of the belting and the load it carries.

To have a straight-running belt, it must trough when empty and conform to the idlers being used. It is the center pulley on a three-pulley troughing idler that steers a belt and makes it run straight—if the idler is set at right angles to the conveyor decking. In a belt that is reversed,

the idlers must set that way. Tilting the idlers slightly in the belt direction in a one-direction belt brings the troughed idlers into the steering act. A little tilt is all right—a little too much and sufficient drag is set up against the bottom belt cover to quickly wear both cover and plies.

We like to sell self-aligning idlers for the carrying strand of the belting, but with the proper belting, and with good alignment and maintenance, they are not needed. If you are going to install a conveyor and then forget it, better put self-aligning idlers in about every 100 ft.

Idler Placement—It was mentioned that troughing idlers are supposed to support the loaded belt. Proper support reduces load disturbance, spillage and belt tension. Three things affect the sag between idlers: (1) load per foot of belt length; (2) belt tension, and (3) idler spacing.

In a well-designed conveyor the load per foot on the belting should be constant and the belting stress will vary from a minimum at the tail end to a maximum at the head end. Hence, giving the load the proper support at all times requires putting the idlers closer together where the tension is the least and farther apart as tension increases. It won't take any more idlers, but it will place them where they will do the most good.

A common mistake at the head and tail ends of conveyors, and on trippers when they are used, is to place the first idler next to the pulley too close to it. You can't change a belt from troughed position to flat without elongation of the belt edges. If this is done in too short a distance the belting is permanently damaged and it is tougher on metal and vulcanized splices.

Except on downhill conveyors, belt tension usually is low at the tail end and edge distortion at this point is not too serious. However, sufficient space should be provided between the tail pulley and the loading chute so that the trough is properly formed before the belting reaches the loading point. Equipment manufacturers should make transition idlers so that this change—at both head and tail ends—is spread over a considerable distance while still furnishing support.

Don't install a bend pulley on reverse curves where an inclined run changes to horizontal. Instead, place a nest of closely spaced troughing idlers on a generous radius to carry the belting over these points with a minimum of edge distortion.

Lubricate the idlers but don't overdo it—and use the proper lubricant. Except in extremely dusty or wet

conditions, greasing oftener than every 6 mo is wasting a lot of labor and grease, and doing more harm than good. Though this may bring me into conflict with the safety engineer for advocating elimination of grease extension tubing on idlers, still I feel that when a bearing is lubricated it should receive fresh material, not stale lubricant.

Handling Impact—Impact idlers of the proper type help protect belting at loading points. I don't advocate pneumatic tires for this purpose. For extremely severe loading conditions, short feeder belts should be installed to take the abuse at loading points, or short pad belts should be used under the regular belt and between the two strands.

Certain conveyor men emphasize the time cycle applying when any point in a belt goes past the loading point. This implies that most of the belt wear and damage occur at the loading point. Theoretically, for the same operating conditions but on one conveyor twice as long as the other, the longer belt is under the loading point only half the number of times, and the belt wear should be only half as much. It doesn't work out that way in service.

Usually there is only one loading point but there are many idlers over which the belt load is conveyed. Some shifting of the load takes place as it goes over each idler, and with large lumps of material the belt carcass is subjected to a lot of impact as it receives a pounding passing over each idler. Therefore, cover wear and abuse take place all along a conveyor, not at the loading point only.

Many operators have proved the value of going to $\frac{3}{16}$ - to $\frac{1}{4}$ -in-thick back covers and not putting all the impact-absorbing cover on the top side of the belting. I believe that a $\frac{3}{16}$ -in top and a $\frac{1}{4}$ -in back is a better-balanced belt-cover combination than $\frac{3}{8}$ and $\frac{1}{4}$ in. The belt cost would be the same in each instance, except that I favor use of a breaker strip in the back cover, as well as in the top, when the back cover is sufficiently thick.

RETURN IDLERS

Factors involved in design and use of return idlers have been discussed in the section dealing with conveyor frames. A spacing of 10 to 12 ft is fairly common. If larger return idlers, shafts and bearings were used, I would favor increasing the space to 20 ft. The doubled belt weight supported by each idler would double the pressure on the idler. This would enable each idler to do a better steer-

ing job on the return strand. More-positive contact should reduce slippage and hence wear, and there would be fewer idlers to maintain.

It has already been noted that as much room should be provided as possible to permit the belt to wander without encountering obstructions. This applies to the entire return strand except that it is necessary for the belt to be centered as it goes over the tail pulley so that it will be aligned under the loading chute for central loading. To insure this, it is necessary to use two self-aligning return idlers, one 30 ft ahead of the tail pulley and the second one 30 ft farther back. The two working together will insure centering on the tail pulley.

I repeat that conveyor frames should be designed so that the return idlers are mounted on stands rather than in brackets.

SAFETY DEVICES

Don't depend upon the human element alone for belt protection. Put in limit switches at the head, tripper and tail ends of conveyors to shut them down automatically if the belt starts to run off the pulleys. Have automatic switches to stop the conveyor if the belt breaks, if there is excessive slippage over the drive pulley, or if the feeders or chutes choke up. Provide a control cord the length of the conveyor for emergency stops. Try to remove tramp iron before it reaches the conveyors. Install automatic sprinkling systems for fire-prevention.

LOADING POINTS

Belt, pan or vibrating feeders or chutes all require enough headroom to provide the necessary space for proper design. But avoid excess headroom since this results in additional impact that must be absorbed in some manner. In addition it increases undesirable degradation with many installations. The design engineer should use all available knowledge in arriving at chute design, but perfection can be achieved only by cutting and trying once the chute is in operation. Chutes built from flat plates welded together perform better than those built with catenary or parabolic plates. Notched chutes are better than grizzly bars. You don't perfect loading points on a drafting board or in one or two field trials.

SKIRTING

Skirting should do two main things: (1) prevent spillage at the loading point and (2) shape the load properly so that it will ride the remaining

length of the conveyor without spillage. My experience is that dual skirting similar to a labyrinth seal is best. The inner skirt board forms the load and deflects it away from the outer skirting, which prevents fines from seeping through.

VERTICAL CURVES

Most handbooks provide a fairly easy formula for determining the radius of the curve to be used in going from a horizontal to an inclined run. From the many installations I have seen where the radius is too short, I suggest figuring by your favorite formula and then multiplying by two. You'll be a lot closer to the right answer.

CLEANING DEVICES

There are many types of cleaning devices in use, and most of those doing a good job really don't have much work to do or they wouldn't be considered successful. I think I have seen a good many of every type, and in my opinion there is only one way to clean a belt—I mean really clean it—and that is with a water spray, with or without squeegees.

BELT MAINTENANCE

Provide Proper Facilities—In most new plants, equipment is installed and facilities are provided for replacing or servicing the major equipment units as needed, including cranes and other service units. But I can count on the fingers of one hand the instances where similar measures have been taken to handle conveyor maintenance and service. But such facilities should be included with all installations.

There is one spot on each conveyor where splicing and repairing can be done the easiest and best. Provide some means for handling the heavy vulcanizer quickly and easily. Provide the proper electrical outlets for connecting the necessary heating and lighting accessories. Choose a place where there will be ample room to work—preferably at a point where the belt tension is the least. Provide shelter to keep out sun, rain and dirt and to provide warmth in cold weather; also provide proper platforms on which to work.

Don't make it necessary to tear out the side of a building to get the old belt out and the new one in. Provide means for winding up the old belt and a let-off for installing the new one. It will save many times its original cost.

Anticipate Breakdowns—In preparing this discussion, I had three main divisions in mind: design, operation

and maintenance. We've done such a good design job that the other two take care of themselves. Perhaps that is a slight exaggeration but we have certainly simplified these other two aspects of the job.

In all my travels, I have encountered only a few maintenance men that concentrated on taking care of equipment to prevent breakdowns. The remainder pride themselves on taking only a few minutes, or hours, or days to get the equipment back into operation.

You can't anticipate breakdowns resulting from defective equipment. But if you are going to prevent breakdowns from wear and service, you have to set up a rigid system of inspection and replacement before breakdowns occur.

Put a man in charge of conveyors. Have him set up an inspection system for motors, electrical controls, reducers, chutes, belting, idlers, pulleys and conveyor alignment. Pay him for preventing torn belts, worn and gouged covers, broken splices and shutdowns. The more conveyors you have the more you need such a man. You don't hesitate to put out \$10,000 or \$20,000 for a single belt. Then spend some money for the equipment necessary to keep it in shape.

Know Your Costs—Keep records of your costs. Put in recording equipment so that you know how much power it takes to operate your various conveyors. If you know the kilowatt-hours used by each conveyor each month and the number of tons handled, you can arrive at a constant for power per 100 tons conveyed 100 ft without lift—or some other figure that will meet your particular needs. Use this constant as a check on the performance of your equipment. When the figure goes up, it means that something on the conveyor needs attention.

Keep track of what it costs you to have belting repaired. You should be able to keep tonnage records for each conveyor. When it calculates to be cheaper to put in a new belt rather than try to keep the old one in proper repair, don't wait for the old one to go to pieces. Replace it.

Conveyors have been used, are being used, and will continue to be used in increasing numbers because they handle material easily in small or large quantities, continuously or intermittently and, in most instances, more cheaply than by any other method.

The recommendations made in this article don't have to be followed to make a conveyor work, but they will help the user really get his money's worth.



FIG. 1—SERVICE VETERANS—two Powers cars that have been used 3 yr with practically no maintenance at the Powers & Preston mine. The bodies are built with extra depth back of the rear axles. The drive is a 5-hp single-phase AC motor through two transmissions in series.

Shuttle Cars From Autos

By J. H. EDWARDS, Associate Editor, Coal Age



FIG. 5—TRACTOR VERSION, showing Hall tractor and car for 32-in. Elkhorn No. 2 seam, Fraley Coal Co. operation, McDowell, Ky.



FIG. 6—TRACTOR TURNS CAR, and then it is pushed to dump by hand.

TEN TONS PER MAN employed, even though loading is done by hand and shooting is done off the solid, is typical performance at small truck mines in Floyd and Johnson counties, Kentucky, where mules and ponies have been replaced by electric-powered buggies or shuttle cars made from junked automobiles. Outstanding features are:

1. Low first cost.
2. A drive consisting of a 5- to 7½-hp 220-v single-phase AC motor powered from a Rural Electrification line or a public-utility connection.
3. Power transmission underground by a trailing cable 300 to 900 ft. long, which is dragged instead of being wound on a reel.

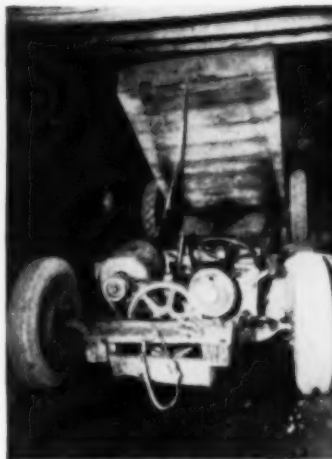
4. Ability of some types of cars to work in seams as low as 26 in, thus eliminating the taking of top or bottom.

5. Low operating and low maintenance costs.

PIONEERED BY POWERS

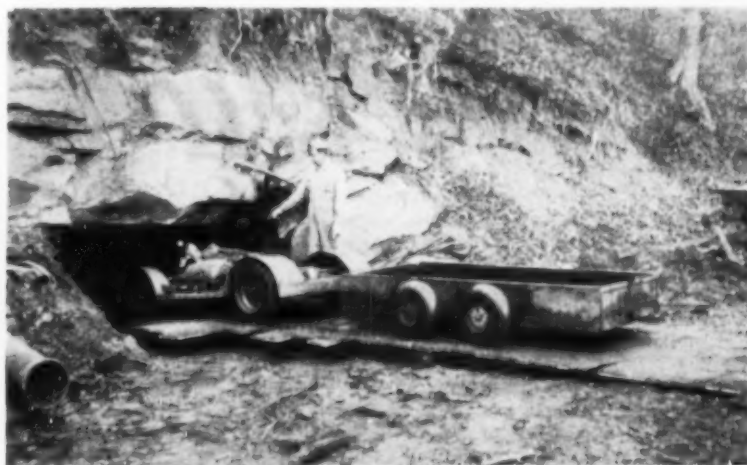
Development leading to the use of the cars was started in eastern Kentucky by Ledford Powers, an experienced loading-machine operator who now runs the 60-ton-per-day Powers & Preston Coal Co. truck mine, at Meally, Johnson County, about 3 mi from Paintsville.

Mr. Powers built the first batch of shuttle cars in cooperation with C. M. McCoy, of the Mountain Metal Co., Prestonsburg, which deals in scrap materials and junked automobiles, and furnished the chassis and trans-



FIGS. 2-4—CAR OPERATION—Ledford Powers shows driver position in low coal. Standing is C. M. McCoy, Mountain Metal Co. Large V-belt pulley (center) is on input shaft of second transmission. Wood frame stands twisting inevitable without springs. Drag cable is attached by harness snap and plug connector.

Eastern Kentucky truck mines pioneer single-phase AC cars and tractors for economical recovery of isolated outcrop areas. Low height eliminates taking top or bottom in thin coal. Cars run by 5- to 7½-hp motors supplied with 220 v by trailing cables.



FIGS. 7-8—DUMPING CYCLE COMPLETED, Hall car is picked up by tractor at the Fraley Coal Co. mine for its return to section. Jeep chassis for tractor provides 4-wheel traction and extra-low gear without second transmission.

missions for the cars. Mr. Powers believes he has built at least 150 of the cars for truck mines in the four-state region of West Virginia, Virginia, Kentucky and Ohio. For the most part, these shuttle cars—complete with body and electric motor, but without trailing cable—have sold for around \$650 each.

Most of these cars are essentially the same as the two cars now 3 yr old and used in a 34-in seam by Powers & Preston (Fig. 1-4). Plymouth and Ford chassis are considered best for building these shuttle cars and the particular ones shown in Fig. 1-4 are made from 1936 Plymouths. The frames are wood and no springs are used. Frame twist resulting from the unevenness of the roadway is taken care of by springing of the wood.

POWERING THE CARS

Two transmissions are used in series in the cars, thus providing a very-low gear ratio and a choice of several speeds. The 5-hp 220-v single-phase repulsion-induction motor is connected by V-belt to a pulley on the power-input shaft of the second transmission. There is no clutch. The motor is started and stopped by the simple means of a 30-amp knife-blade-type safety switch.

The operator's position on a low-slung platform back of the left front wheel is shown in Fig. 2. Car height is 28 in and the highest points are over the 6:00x16 tires. Total length of the car is 15 ft. The 4x10-ft body hinged on the rear axle is deeper back of the axle, has a swing endage, and dumps backward by gravity when released.



FIG. 9—UNDER CONSTRUCTION in Hall shop: low capacity experimental loader (left) and jeep tractor.



FIG. 10—FOUR-WHEEL-STEER TRACTOR by David Reed and used by Sammons Coal Co., Drift, Ky., in 37-in coal.



FIG. 11—FAVORED TYPE—2-wheel-steer 4-wheel drive tractor preferred by David Reed (Wilson Creek No. 23 mine).



FIG. 12—UNDER CONSTRUCTION—new trail car at David Reed shop, with parts of welded-on drop axle.

The body is practically balanced when empty, and thus is easily restored to level position by one man. Loads of 1½ tons are normal.

Mr. Powers uses No. 10 two-conductor cable, and is hauling 1,750 ft from working face to portal. Cables are tied mechanically to the car by a strain clamp and an easily-operated harness snap or ring, and are connected electrically by a heavy-duty cord-type connector. Power is conducted to the underground stations, where the trailing cables are center-hung, by two insulated wires on insulators or posts along the ribs. For long-distance hauling, the car transfers from one cable to another during the process.

TRACTORS INCREASE FLEXIBILITY

Truck mines delivering to the tippie of the Turner Elkhorn Coal Co., at Drift, in Floyd County, employ a tractor-and-car variation of the idea of the single-phase shuttle car. Mark and Ward Reed, managers of Turner Elkhorn and the affiliated interests of C. D. Reed, saw the possibilities of an automobile-type shuttle car for small mines in contour or outcrop openings, but did not like the requirement that a shuttle car be tied up while it was being hand loaded, as well as the interruption in loading that occurred while the car was delivering its coal and returning.

Accordingly, they began building single-phase tractors

to pull rubber-tired cars 3 yr ago. Now, a considerable tonnage handled by the Reed interests comes from truck mines using these units. Army jeep chassis are used to provide the advantages of 4-wheel traction and extra-low gear without adding a second transmission.

Argis Hall, master mechanic for the Reed properties, has built eight units, each consisting of a jeep tractor and three rubber-tired cars (Fig. 5-9). Four are owned by the Reed interests and the other four are leased by Mr. Hall to truck mines at 25c per ton, including tire renewals and maintenance.

These tractors feature 2-wheel steer, steel frames and a single coil spring over each axle. Total height of the tractor is only 22 in when equipped with the 5:00x8 6-ply airplane-type tires and wheels on which Mr. Hall has standardized for both tractors and cars.

Other dimensions of the Hall tractors are: wheelbase, 70 in; gage, 52 in; total width, 60 in; total length, 9 ft. Drag cables powering the tractors usually are No. 6, two-conductor. Usual lengths are 300 to 500 ft. With center hanging, this permits penetration 600 to 1,000 ft in from the portal.

Six of these tractors are powered by 7½-hp 220-v single-phase AC motors of the repulsion-induction type. Two are equipped with 10-hp 250-v series-wound DC motors. Standard jeep transmissions are used on the AC tractors. On the DC units, the transmissions are omitted and speed



FIGS. 13-14—DUMPING AND RETURN at Whitten mine. Car has stepped-steel frame to accommodate cross spring above front axle. Back portion of body is 9 in deeper than front. Power train includes 5-hp motor and two auto transmissions.



FIG. 15—TUFFY CAR shown in Figs. 13-14 in action at Whitten Coal Co., mine bringing out 1.8 tons of coal.

control is by rheostat. In most instances the motors are connected by V-belts. However, a few have direct drives to the transmission-input shafts.

The cars made by Mr. Hall are without springs and all of the wheels are in fixed alignment. The 4x8-ft steel body is 12-in deep, and the normal load is 1¼ tons. The cars are provided with lift endgates and are emptied in tilting horn dumps. Drop axles are used and total car height is 19½ in.

With used jeep parts and used electric motor, a tractor can be built for approximately \$1,200. Construction cost of a car is \$280 or more.

Mr. Hall is experimenting with a low-capacity loading machine 20 in high and built on a jeep chassis. The conveyor is placed to one side of center to provide room for the motor, drive equipment and operator.

JEEPS PROVIDE MATERIALS

David Reed, in his shop at Maytown, has built six jeep tractors and a number of cars which are used at truck mines delivering to the Reed tipples (Figs. 10-12). He uses standard jeep wheels and tires (6:00x16). The electric motor is overhung at one end, while a cab for the driver is overhung at the other. One of these tractors, used at the Sammons Coal Co. mine and shown in Fig. 10, is 4-wheel steer as well as 4-wheel drive. However, only one pair of wheels is steered at a time. In one direction,

the rear pair of wheels is locked and the other pair steered, and vice versa.

David Reed now favors the plain 2-wheel-steer 4-wheel-drive tractor of the type shown in Fig. 11 and used at the Wilson Creek No. 23 mine, Turner Branch Coal Co. It is equipped with a 7½-hp General Electric repulsion-induction 220-v motor and a Clark pushbutton-operated starter. Mr. Reed believes that the higher cost of 4-wheel steering is not justified, since it requires two jeep front axles and thus takes practically two jeeps for one tractor, while one jeep furnishes the parts for a 2-wheel-steer unit.

Fig. 12 shows the David Reed lift-endgate cars, including the unwelded parts of a drop axle (in the car) to indicate the type of construction. Wheels and tires are airplane-type 17 in high and using 45 lb of air pressure. The car has no springs and the wheels are held in rigid alignment.

LOW CAR FROM AUTO PARTS

Another type of straight shuttle car has been built by Tuffy's Welding Shop, Paintsville. One of these cars, in use by the Whitten Coal Co., Sitka, Johnson County, is shown in Figs. 12-14. Made from automobile instead of jeep parts and using 6:00x16 tires, this car has a steel frame, which means that springs are necessary to take care of the twist. The rear axle is a plymough, the front axle is a Ford V-8 with cross spring, the first transmission is Ford and the second is Plymouth. The drive is a 5-hp 220-v repulsion-induction motor connected by V-belts.

To make the car body as low and deep as possible, the steel frame is built with a step-up immediately back of the front axle to provide height for the cross spring. The 4½-ft section of the steel body back of the rear axle is 18 in deep and the 6½-ft front section is 9 in deep. Properly loaded, practically all the weight is on the rear axle, which is the pivot point for end dumping.

Capacity as used at the Whitten Coal Co. mine is 1.8 tons. Instead of an endgate, the last 10 in of the body is sloped up to prevent spillage during travel while permitting the coal to slide out at the dump. Height of the car (or tires) is 27 in. The drag cable is No. 8 two-conductor.

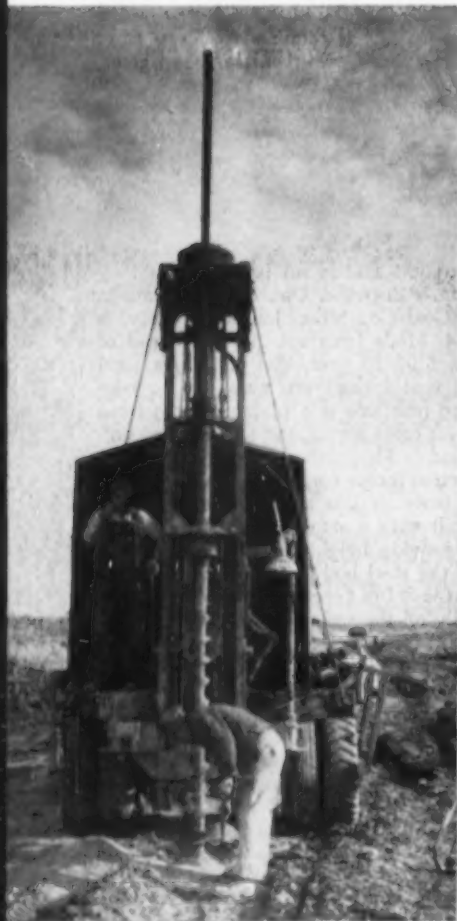
A question might be: How are the cars kept from running over the cable? Users report that they do not try and that running over the cable does not seem to hurt it.

While the automobile-type single-phase A-C shuttle cars and tractors are being exclusively used at very small mines, their aggregate capacity is estimated to be 6,000 tons per day. In a large measure, this is coal from crop areas that were abandoned when the original railroad-shipping mines were worked out.



BUSY SCENE—Big walking dragline works from bench of shot shale, while twin vertical drills sink holes in advance of dragline. Topsoil and clay were spoiled on previous pass to make bench for dragline.

Mining and Loading in the Evans Pit



VERTICAL DRILL, working ahead of dragline, drills in thick, tough shale.



LOADING SHOVEL, here working near a fault, has specially designed wide, shallow dipper for working in this seam. Sulphur content rises near fault.



STOCKPILED COAL will be blended with lower-sulphur coal when loading shovel moves beyond fault area. Meanwhile, preparation plant shuts down.



SELF-PROPELLED UNIT with twin pumps and power winch throws pit water up over highwall.



UTILITY TRACTOR has pump on rear. Dozer blade can be removed for pinning rig.

Stripping Low-Sulphur Coal

Here's how Evans Coal Co., stripping coal for steel mills . . .

Speeds work with special equipment

Guards against spoil-bank slides

Handles soft clay and heavy shale

Washes 1/4x2-in coal on tables

TABLES FOR CLEANING 1/4x2-in coal, a cleaned product containing from 0.4 to 0.6% sulphur, temporary stockpiling of raw coal containing more than 1% sulphur, laboratory-controlled feed and a radio-communications system that spans the 25 mi between mine and company office—these are top features in stripping operations of the Evans mine, Evans Coal Company.

The mine, producing up to 1,500 tpd of premium-grade metallurgical, low-volatile coal for sale chiefly to Sheffield Steel Co., is 4 mi north of Bokoshe, Okla., and 25 mi, as the crow flies, from the company office in Fort Smith, Ark. S. E. Evans, with headquarters at Fort Smith, is president of the company and also of Evans Construction Co., with widespread interests in road-building, pipeline construction, iron-ore mining and other activities.

Other officials of the Evans Coal Co. are Fred McLane, general manager, who divides his time between the Fort Smith office, the mine and other company operations; A. E. Smithson, general mine superintendent; Ben McClellan, mine foreman; E. E. Whitten, preparation foreman; A. W. Albrecht, chief electrician; E. M. Alderson, chemist; and Norman Zahn, engineer. F. W. Jung, chief geologist for Sheffield Steel Corp., drops in at the mine from time to time to help with special problems. All keep within instant reach of each other by use of a Motorola radio network, with receivers and transmitters located in city offices, mine offices and official cars. Reliable range of the radio is up to 50 mi.

The seam now being mined is 24 to 30 in thick and averages a little over 26 inches. It is a low-volatile, very low-sulphur coal with a coking index

of 9. The seam dips to the northwest at about 10%. Stripping ranges from 15 to 70 ft. The overburden is in gently rolling terrain. The top 6 in of cover is grass and topsoil. Beneath the topsoil is 4 to 6 ft of clay. The remainder of the overburden, down to the coal, is hard shale that requires heavy shooting.

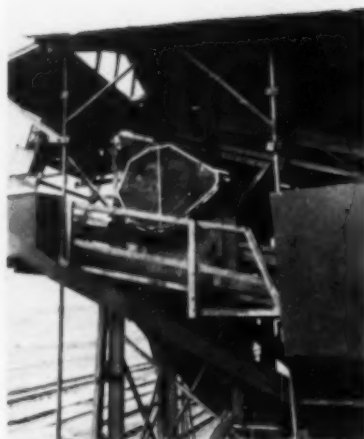
WORKING DEEP AND SHALLOW COVER

In shallow overburden, where the shale is thin, two McCarthy self-propelled horizontal drills are used with good results. But in thicker, heavier shale, two McCarthy vertical drills mounted on trucks do the job. Both types of drill cut 6-in holes, which are charged with 5-in Hercumite or 60% extra dynamite, with Gelamite 2 as primer. Fine-ground shale from the drill holes provides stemming material. For a 50- to 60-ft cut—normal width of the pit for Evans—vertical holes are drilled on 15-ft centers in two staggered rows 15 ft apart. Drill bits are Carboloy.

The big stripping unit is a 500-W Bucyrus-Erie walking dragline, 4,400 v., DC, with a 185-ft boom and a 12-yd Page bucket. An extra bucket is kept on hand as a spare. The company's experience shows that the



ROTARY BREAKER breaks coal to minus 8-in. Grizzly screens plus $2\frac{1}{2}$ in.



PRIMARY CRUSHER cuts plant feed to maximum of $2\frac{1}{2}$ -in.



PRIMARY SHAKER sends plus $1\frac{1}{4}$ -in to crusher; smaller size to vibrator.

Preparing the Coal for Steel-Mill Customers



SURGE BIN feeds plus $\frac{1}{4}$ -in from vibrating screen to concentrating tables.



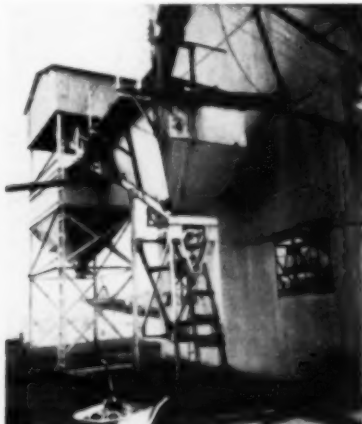
CONCENTRATING TABLES—a battery of eight—are fed from distributor. Coarse refuse goes to bin; fine solids and water flow to settling tanks.



DEWATERING SCREEN handles up to 100 tph or more of tabled coal. Water and fine coal flow to settling tanks.



FROM PRIMARY SETTLING TANK drag pulls fine solids onto belt carrying minus $\frac{1}{4}$ -in coal to loading booms.



REFUSE TANK (right) receives water with solids from settling tanks. Solids are dragged out to refuse bin (left).



S. E. EVANS, president, has interests in mining, construction and equipment.



FRED McLANE (right) is general manager; **A. E. Smithson**, supt.



NORMAN ZAHN (right), engineer, and **F. W. Jung** meet at the pit.

Key Evans Officials Keep Coal Moving



BEN McCLELLAN, mine foreman, directs loading in the pit and hauling.



E. E. WHITTEN, tipple foreman, covers operations of the wash plant.



F. K. WOOD, assistant treasurer, keeps things going in the Fort Smith office.



A. W. ALBRECHT, chief electrician, keeps machinery and equipment operating.

spare bucket is sensible economics.

The dragline works on top of cleared-off shale, which is drilled and shot in advance of the dragline's progress. A Caterpillar D-8 tractor with a 'dozer blade stands by to level off bumps that result from shooting the shale, thus providing a level bench for the dragline.

Stripping is done in two steps. Standing on shale that it has cleared off earlier while making the preceding pass, the dragline reaches beyond the shale it stands on, scoops up a 50- to 60-ft swath of clay and topsoil overlying the next succeeding cut, and casts this clay and topsoil far over into the worked-out pit. Next, still standing on the shale and without advancing, the dragline picks up the shale on which it rested before its last advance and casts the shale on and

against the near slope of the spoiled topsoil and clay. This system has two merits: (1) it provides a solid working bench for the dragline, which, in wet weather, would bog down if it stood on the topsoil and clay; and (2) it makes good use of the spoiled shale as a guard against sliding of the spoiled clay. The dip of the seam being 10%, all precautions must be taken to avoid slides.

LOADING THE COAL

Overburden being removed, the top of the exposed coal is cleaned off with any one or a combination of the following units:

1. A Caterpillar D-6. This is a versatile unit. On its rear is mounted a Jaeger 8-in centrifugal pump, 1,700 rpm, which is driven by the D-6 engine through the transmission. On

the front end is a pinning rig with a 2-ton weight used for breaking the coal before loading. The winch that hoists the pinning weight is powered by the D-6 engine. Also on the front end, it is easy to remove the pinning frame and attach a 'dozer blade.

2. A Caterpillar No. 12 Road Patrol.

3. A Caterpillar D-7 tractor equipped with a 'dozer blade.

4. A Huber Road Maintainer, which brushes dirt off the exposed coal.

The first three units also are used for building and maintaining haulage and pit-access roads, as well as for other grading jobs around the mine.

The loading shovel is a K-370 Link-Belt Speeder, Caterpillar-diesel powered. It is equipped with a specially designed 2½-yd Esco dipper, made

wide but shallow to scoop up more coal and less bottom in the thin seam.

A fleet of 12 end-dump International trucks, 10-ton capacity, haul the coal from pit to preparation plant. The run now is about 3 mi each way. A thirteenth truck is equipped with a water tank for sprinkling roads, a job that had to be done almost constantly last summer and fall, during the long drought. Roads, 28 ft wide, are built with refuse from the cleaning plant—a conglomerate of various sizes from $\frac{1}{4}$ to 2 in. In the rolling country, drainage of roads is no great problem and grades are easy on trucks.

To keep the pit dry, two 8-in Jaeger centrifugal pumps, driven by V-belts from a single 150 hp General Motors diesel engine and mounted on a surplus Army half-track, are moved wherever water accumulates. As shown in one of the accompanying photographs, a winch is mounted on the front of the half-track and a cable, passing over sheaves to the rear end, raises and lowers the intake pipes. Water is piped out, usually up and over the highwall, through 8-in irrigation-type aluminum pipe, equipped with quick-closing clamp joints. A section of canvas hose is used to make the turn over the edge of the highwall. The company also keeps a 4-in Jaeger centrifugal pump on hand for yeoman service around the pit, plus the 8-in Jaeger mounted on the D-6 tractor, described earlier.

From time to time, especially at and near faults in the seam, the sulphur content of the coal rises to as much as 1.2 to 1.3%. When this occurs, the preparation plant shuts down and trucks haul coal to a stockpile near the unloading hopper at the

plant. There the coal is stored, being leveled and compacted by the D-6 and its 'dozer blade, until the loading shovel again runs into coal with a lower sulphur content. When the usual low-sulphur coal again begins to flow to the plant, the stockpiled coal is blended with it in a ratio of about one part of stockpiled coal to three parts of lower-sulphur coal.

Blending the fresh-mined and stockpiled coal is simple. A Hough Payloader lifts the stored coal into trucks, which haul it up the ramp and dump it into the preparation-plant hopper.

CLEANING COAL IN THE PLANT

Coal is fed from the hopper through an apron feeder into a rotating drum breaker, made to order by United Iron Works, Pittsburg, Kan. Rotating at 12 rpm, the breaker reduces the raw coal to 8 in maximum. A drag conveyor lifts the broken coal up to the primary crusher located, like the breaker, outside the plant. The primary crusher—a 36x42-in McNally single-roll job—reduces the coal to 2½-in maximum. A grizzly between the breaker and the primary crusher sifts out the minus 2½-in coal, which thus bypasses the crusher.

The raw coal, now reduced to minus 2½-in, is moved by belt conveyor into the main plant. There it passes first over a 1¼-in primary screen. Plus sizes go to the secondary crusher—a 24x24-in double-roll installation—and then are passed over a ¾-in secondary screen, together with the minus 1¼-in coal that passed through the primary screen.

In the seam mined by Evans, most of the impurities are found in the plus ¾-in sizes. The minus ¾-in coal is

of very high purity. The coal that passes through the ¾-in secondary screen, therefore, is carried by drag conveyor directly to the loading booms and is loaded into railroad cars for shipment. Along the way, fine solids that have settled to the bottom of the primary settling tank and have been dragged out of the tank are mixed with the minus ¾-in product from the secondary screen and loaded into cars.

The plus ¾-in coal from the secondary screen, some of it running up to 2 in, is conveyed by belt to a 35-ton surge bin outside the plant and thence, as needed, to a 400-gpm distributor tank at the top of the plant. There the coal is mixed with water and fed through eight 6-in distributor pipes, laid out like the legs of a spider, to a battery of eight Deister SuperDuty Diagonal-Deck concentrating tables. Raw feed to the tables totals about 125 tph; clean product from the tables, about 100 tph or more. The tabled coal is discharged to a de-watering screen, the discharge end of which joins the discharge of the minus ¾-in coal. Here the washed and unwashed coals are blended and loaded into the railroad cars. Coal is shipped with a guaranteed maximum of 6% moisture.

Fine products from the tables, like the unwashed minus ¾-in coal from the secondary screen, contain few impurities. As a slurry, they flow by gravity to the primary settling tank, whence, as pointed out earlier, they are dragged out from the bottom and mixed with the unwashed minus ¾-in sizes.

Coarse refuse from the tables is moved by drag conveyor to the refuse bin.

Overflow from the primary settling tank spills over into the secondary tank for clarifying, after which it is pumped to the tertiary tank. Water in this third tank is excess water—that is, the equivalent of fresh water added to the plant circuit over and above what was drawn from the big settling pond near the plant. Excess water, together with settlings from the secondary and tertiary tanks, is pumped upward to the refuse tank. There, in the refuse tank, a drag conveyor pulls the fine refuse out and deposits it in the refuse bin to be hauled away, along with coarse refuse, for road-building or disposal elsewhere. Excess water from the refuse tank flows by gravity to the outside settling pond. Two 5-in Ingersoll Rand centrifugal pumps with G.E. motors pump water and contained solids from the secondary to the tertiary settling tank and up to the refuse tank. Fresh water is drawn from a 53,000,000-gal lake.

★ ★ ★ A Man's Prayer ★ ★ ★

We thank thee, Almighty Power, for the Gift of Life.

We thank Thee for friends and little children, for flowers and trees, for light and stars and sunsets, for darkness and the sweet forgetfulness of sleep.

We thank Thee for laughter, for music and the singing winds.

We thank Thee for the sense of humor which is one with that of proportion and by means of which we learn not to be too prideful either of ourselves or of our works.

We thank Thee for those great and splendid souls whose vision and wisdom have unlocked for us the gates of knowledge so that we may better learn to walk the perfect paths of understanding.

And for constant and countless other proofs of Thy friendly care we thank and honor Thee so long as we shall live.

And when the time shall come for us to set aside our present tasks and lay us down to rest, or perchance find further evidence of Thy goodness in another world, may we be filled with courage and contentment and the peace which passeth all understanding. Amen.

Henry Cragin Walker, For the Cortright Coal Co.

More Light for Coal Mines

By THOMAS ALLEN
Chief Coal Mine Inspector,
State of Colorado



FIG. 1—Oil cap lamp had ring around spout to keep excess oil off miner's nose and forehead.

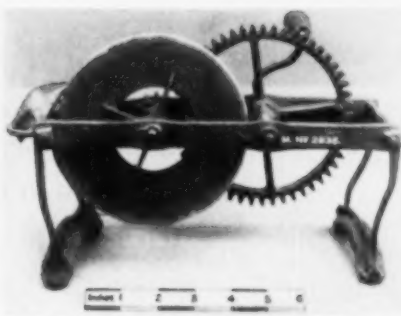


FIG. 2—"Steel mill" provided light from a shower of sparks. This one dates from the eighteenth century.



FIG. 3 — Davy lamp used in Colorado had hanging hook and hasp lock.



FIG. 4—Clanny lamp had glass cylinder around flame for better illumination.



FIG. 5—Early carbide cap lamp had plunger for water control but no igniter.

IT'S A LONG HAUL—many hundreds of years—from the flickering open flame of a grease-soaked strip of wood to the modern electric cap lamp with its 50 candlepower. Always, through the years, the problem was to reconcile the miner's need for light with the danger, ever present, of explosive gas.

The candle—first tallow, then wax—and the open oil lamp (Fig. 1) took over from the fat-soaked stick but they, like the stick, had open flames which, until the electric cap lamp came along, took a heavy toll of life.

The first recorded death from gas ignition was that of Richard Backas who, according to an entry in the parish register of St. Mary's Church, Gateshead-on-Tyne, England, was "burnt in a pit Oct. 14, 1621." Though the record doesn't say so, Backas may have been a "fireman"—a man who wrapped himself in wet clothes and preceded regular miners into the workings, thrusting ahead a long pole with a burning candle or lamp at its end to light up any gas ahead. Needless to say, firemen didn't survive long.

Employers found, to their surprise, that small candles ignited gas as quickly as big ones. So they set "eternal lights"—lights that burned all the time and consumed the gas as fast as it was given off. Eternal lights, though, were no real answer, nor was the feeble glow from phosphorescent fish skins and rotten fish any great help.

In 1750 Carlisle Spedding, a mine mechanic, rigged a cumbersome "steel mill" to provide light from a shower of sparks made by turning a wheel rapidly on a flint (Fig. 2). Each miner employed a boy to turn the wheel. But in 1812, an explosion killed 90 men at the Felling colliery, Newcastle, where steel mills were used. The resulting publicity, spread by the local parish priest, the Reverend Mr.

Hodgson, caught the attention of the British government, which directed Sir Humphrey Davy, foremost scientist of the time, to search for a solution.

Sir Humphrey in 1815 devised a safe lamp in which the flame was enclosed in a wire gauze cylinder, with 784 holes per square inch (Fig. 3). About the same time George Stephenson, developer of the first successful steam locomotives, built a similar lamp with a glass cylinder inside an outer gauze and a gauze cap on the cylinder; and Dr. Clanny, a mine physician, brought out a lamp with a glass cylinder around the flame and a gauze fitting above the glass (Fig. 4). The Clanny lamp gave more light than either of the other two.

From 1815 to 1915, the Davy and Clanny lamps were widely used with but few improvements. Hasp locks and, after 1833, key locks were added to prevent opening the lamp inside the mine. A steel bonnet was placed over the gauze and, in a later stage, two gauzes replaced the single gauze.

These lamps were used not only for light but also for detecting gas. As the years passed, special features were added to increase the lamp's usefulness as a gas detector. The result is the modern flame safety lamp, now used not for light but for safety.

The small carbide cap lamp, developed from bicycle lamps used by miners to light their path to and from work before dawn and after sundown, began replacing the oil lamp about 1906. Early models (Fig. 5) had no igniters but later ones used the steel-mill principle—turning a wheel against flint to make sparks.

The electric hand lamp was first introduced in the United States about 1901. The electric cap lamp, safe beyond any question after many centuries of search, first made its appearance about 1908, in the anthracite mines of Pennsylvania.

Heated Screens Pay Off

Installation improves plant performance at Dawson Daylight by recovering 10Mx0 coal formerly partially wasted . . . boosting screen efficiency and life . . . and saving screen-change time.

RECOVERING $\frac{1}{4}$ x0 coal formerly partially wasted, stepping up screening performance, and reducing the number of screen changes are top benefits derived from three heated-screen vibrator units installed at the New Daylight preparation plant of the Dawson Daylight Coal Co., Dawson Springs, Ky.

Located beneath three raw-coal vibrating screens, the heated units are put into service when 1x10M or $\frac{1}{2}$ x10M commercial stoker is being made. They receive raw $\frac{1}{4}$ x0 from the three primary vibrators and separate it into $\frac{1}{4}$ x10M and 10Mx0 fractions. Before they were installed, the 10Mx0 material was partially wasted as a result of being diverted to the washing system with ensuing loss of 28Mx0 from the 10Mx0 in final washing. Also, wet or damp coal was not screened completely and as a result some of it passed over as coarser material. Now this is recovered, the 10Mx28M being loaded with the commercial stoker and the 28Mx0 being loaded with the raw carbon.

The new units are 5x7-ft Type "C" Leahy No-Blind vibrating screens, manufactured by the Deister Concentrator Co. Heat for the units is provided by Type C FlexElex electric heaters supplied by 15-kva transformers with 440-v single-phase 60-cycle primaries and variable secondaries. Power enters the units through Type AF 262 60-amp 600-v Westinghouse safety switches.

Raw coal from the mine is delivered to the tippie by a 981-ft 30-in Joy belt conveyor powered by a 440-v 125-hp motor. Two Tyler Ty-Rock 5x14-ft double-deck circle-throw screens separate the raw feed into plus $\frac{1}{2}$ -, $\frac{1}{4}$ -, or 1-in, $\frac{1}{2}$ x $\frac{1}{4}$, $\frac{1}{4}$ x $\frac{1}{4}$ or 1x $\frac{1}{4}$ and $\frac{1}{4}$ x0 products. The plus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in is delivered to a 48-in Jeffrey picking belt where refuse is removed and chuted to the refuse belt which delivers it to a storage bin. Trucks haul rock from the bin to a refuse-disposal area.

After hand picking, the plus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in passes to a 24x36-in McNally-Pittsburg double-roll crusher where it is broken to minus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in. This resultant is elevated by a series of three 24-in belt conveyors to an Allis-Chalmers 6x14-ft Ripl-Flo vibrator at the same elevation and

in line with the two 5x14-ft Tyler screens. Products of the Ripl-Flo are plus and minus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in, with the larger size going by chute to a 36-in Jeffrey belt for delivery to a 24-in American Pulverizer Co. ring crusher. The resultant is recirculated and rescreened on the vibrator. The minus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in is delivered to the washer.

Raw $\frac{1}{2}$ x $\frac{1}{4}$, $\frac{1}{4}$ x $\frac{1}{4}$ or 1x $\frac{1}{4}$ from the two Ty-Rock screens is delivered directly to the 36-in belt for delivery to the jig. The remainder, $\frac{1}{4}$ x0, discharges by chute to a belt for delivery to the carbon bin or the railroad car.

Clean coal from the jigs is delivered to two 6x16-ft Robins Eliptex dewaterizers which normally separate it into $\frac{1}{2}$ x $\frac{3}{4}$, $\frac{1}{4}$ x $\frac{3}{4}$ or 1x $\frac{3}{4}$, $\frac{3}{4}$ x $\frac{1}{4}$ and $\frac{1}{4}$ x0 products. The two larger sizes are combined and discharged onto two 24-in belt conveyors which deliver $\frac{1}{2}$ x $\frac{3}{4}$, $\frac{1}{4}$ x $\frac{3}{4}$ or 1x $\frac{3}{4}$ stoker coal to railroad cars. The $\frac{1}{4}$ x0 is a product of crushing the plus $\frac{1}{2}$ -, $\frac{1}{4}$ - or 1-in material and is pumped to a 3x12-ft Robins vibrator equipped with a 28-mesh screen. The $\frac{1}{4}$ x28M is chuted to a loading belt for delivery to railroad cars and the under-size passes by gravity to waste.

The heated-screen units enter the picture when 1x10M or $\frac{1}{2}$ x10M commercial stoker is being made. One screen change from 1 in to $\frac{1}{2}$ or $\frac{1}{4}$ in is necessary on the primary R-O-M vibrator if the $\frac{1}{2}$ - or $\frac{1}{4}$ -in size is to be made. A diverting gate is positioned to direct the $\frac{1}{4}$ x0 to the three heated units which separate it into $\frac{1}{4}$ x10M and 10Mx0. Formerly, a screen change was made on the vibrators and coal followed the previously described route. However, screening was poor when damp or wet coal was delivered from the mine. As a result, the screens blinded and workers were placed at the vibrators with brooms, rakes and scrapers in an effort to keep the screens open. Even then results were not satisfactory as some of the fine coal adhered to the larger particles and was delivered to the washer. In some instances it was necessary to stop the plant until the screens could be cleared. Screen life was shortened because of the scraping necessary to open them when blinded. Wet screen-

ing was tried but was not satisfactory because part of the $\frac{1}{4}$ x0 was wasted.

The $\frac{1}{4}$ x10M from the heated units is belt-conveyed to the jig while the 10Mx0 carbon is carried to the carbon belt by individual belts under each unit.

Addition of the heated-screen units has provided the following benefits for the New Daylight plant:

1. Elimination of tippie shutdowns to clear blinded screens.

2. Saving of the $\frac{1}{4}$ x0 coal formerly wasted.

3. Elimination of time and labor required to make a screen change.

The New Daylight mine of the Dawson Daylight Coal Co. was developed in 1952 to replace tonnage from the Kentucky No. 6 seam which the nearly depleted Daylight No. 6 mine was no longer able to produce in sufficient quantity. Surface construction and underground development are still in progress, with completion scheduled for this summer.

Management of the New Daylight mine is in the hands of J. H. Schneider, president; W. A. Borries, vice president in charge of operations; Virgil Smith, superintendent; G. A. Stokes, mining engineer; and Arvil Casteel, preparation manager.

The No. 6 coal produces an all-weather coal which does not form a coke tree or flyash in periods of light firing. As a result, demand for the coal has been good and the mine is working full time.

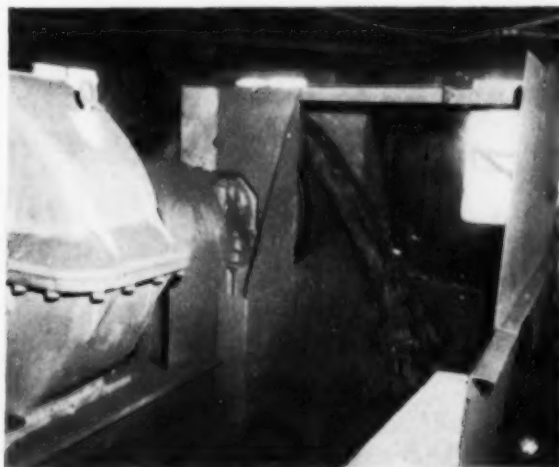
In planning the mine, careful consideration was given to selecting equipment and a mining system that would yield maximum production with minimum manpower. Working sections are concentrated and belt haulage is used in room panels. Haulage from the section is in dropbottom mine cars that dump into a 100-ton bin from which coal is fed to a 30-in belt for delivery to the preparation plant. A loop haulage system permits uninterrupted loading when trip changeouts are made. Supplies are handled by a battery-powered shuttle-car and trailer combination. Roof bolting is done on the main haulage-ways and in the working sections where bad top is encountered. Spare equipment is available underground and is kept in readiness in case the working units break down.



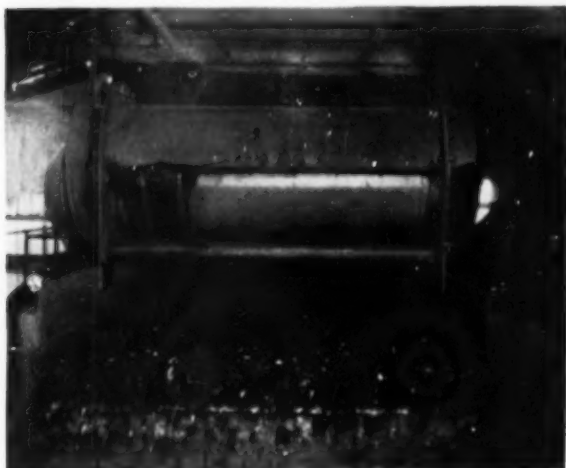
NEW DAYLIGHT PLANT washes and sizes coal from the underground mine, specializing in high-quality stoker coal.



HEATED SCREENS play an important role. Three units are recovering $\frac{1}{4}$ x0 coal and upping screening performance.



DELIVERY OF COAL from the new slope is by 30-in belt conveyor discharging directly to primary screening units.



FINAL DEWATERING and sizing of the washed stoker product is accomplished on two 6x16-ft screens.



PRESIDENT J. H. SCHNEIDER stresses the importance of good coal preparation in achieving customer satisfaction.



At Least 30% Less

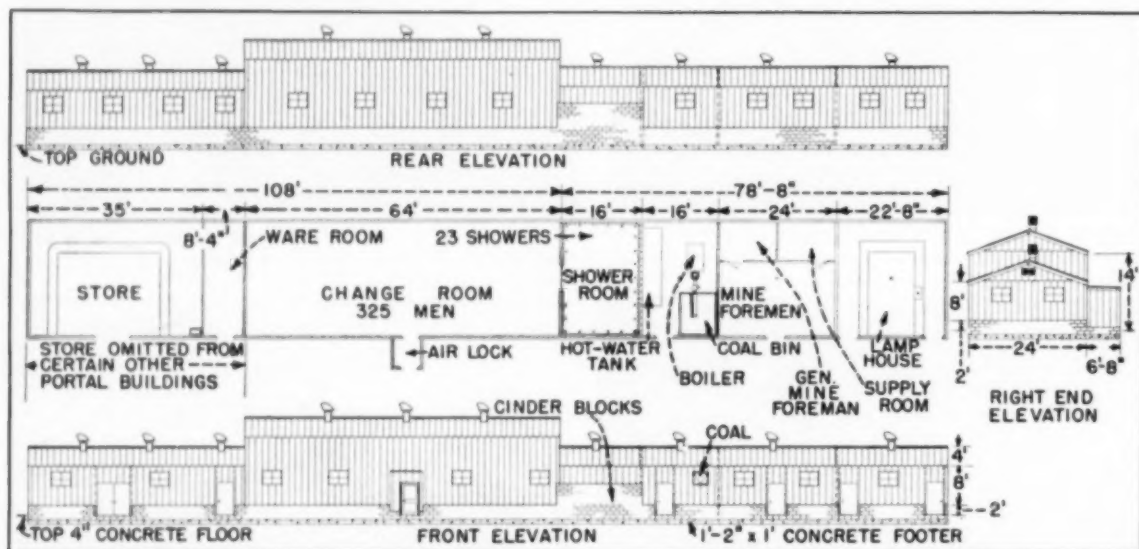
SAVINGS in cost of construction of at least 30%, in the estimation of company officials, have been achieved through the adoption of standard steel mine-service buildings in place of buildings utilizing frame or block construction at mines of the Red Jacket Coal Corp., Red Jacket, W. Va.

Beginning with a bathhouse installed in 1948 at Coal

Mountain mine, the list of steel buildings at Red Jacket mines has grown to 22 and includes two units each 188 ft long and serving as portal buildings. Without a store, length is 142 ft 8 in., as at the Pigeon Creek portal for No. 17 mine, shown above before painting.

Further savings will accrue if and when any of the buildings have served out their usefulness in the original locations and are dismantled and reassembled at new operating sites.

Service Buildings for $\frac{1}{3}$ Less



Standard Yet Flexible

WITH STEELOX CONSTRUCTION, Red Jacket engineers have developed plans for a "maximum" portal building. It is 24 ft wide and is composed of sections so standardized that it is adapted to the needs of a "lesser" location simply by leaving off an end or a middle section. The first of these "maximum" portals went into service early in 1950 at the Keen Mountain (Va.) mine, and the second later that year at the Wyoming (W. Va.) mine on the Right Fork of Turkey Creek.

Building length, as shown in the above plan of the Wyoming portal building, is 186 ft 8 in. Ceiling or eaves height is 8 ft for all sections except the bathhouse, which is 14 ft. Rooms in the building have the following lengths: retail store (left), 43 ft 8 in; change room of bathhouse, 64 ft; shower room, 16 ft; boiler room, 16 ft; office 24 ft; lamp house, 22 ft 8 in. Partitions are of the same SteeloX construction as the outer walls. All the SteeloX lamp houses, except the first at Coal Mountain (1948), are of the self-service type for added convenience and economy in providing lamp service to men.

Red Jacket Steel-Building Installations in Last 5 Yr

COAL MOUNTAIN MINE

Bathhouse.

Lamp house (attached to bathhouse but at lower level).

Substation, 200-kw unit.

WYOMING MINE

Car-repair shop.

Bathhouse at tippie.

Water-filtration plant.

Portal building, Right Fork Turkey Creek (store, bathhouse, office and lamp house).

KEEN MOUNTAIN MINE

Substation, 500-kw capacity.

Portal building (store, bathhouse, office and lamp house).

JUNIOR MINE

Substation, No. 9 Drift, two 200-kw units.

Man shelter and mine-foreman's office, No. 9 Drift.

Substation, 500-kw capacity, Lower Lick Branch.

NO. 17 MINE

Shop.

Substation, 500-kw capacity.

Mine foreman's office, payroll office, assistant superintendent's office.

Cover, run-of-mine bin.

Bathhouse and lamp house at preparation plant.

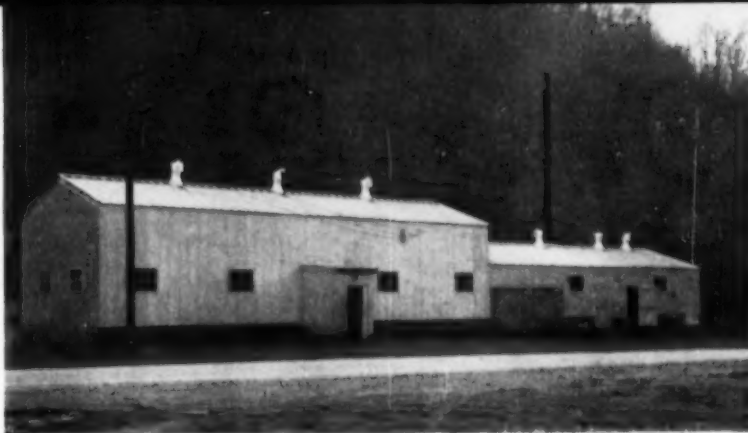
Substation, two 200-kw units, Pigeon Creek.

Portal building, Pigeon Creek (bathhouse, mine-foreman's office and lamp house).

GENERAL

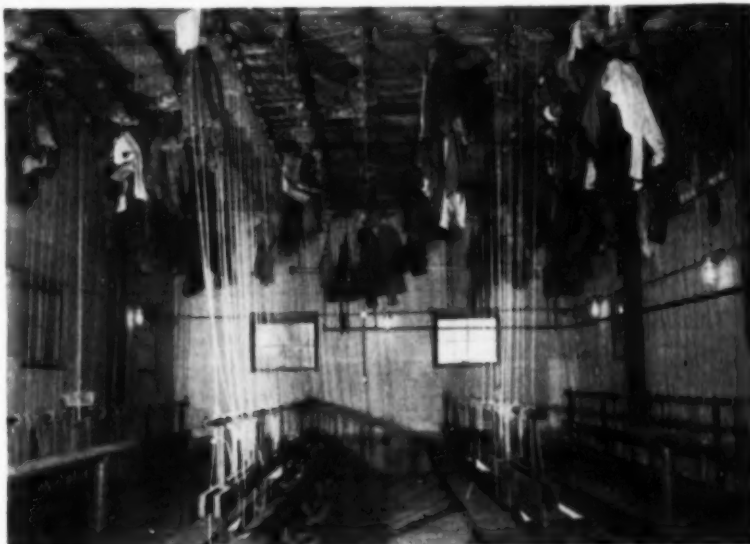
Storage garage, 5-car capacity.

Automobile-maintenance garage.



Greatest Savings in Erection

ALL THE BUILDINGS in the Red Jacket standardization program are Steelox units made by the Armco Metal & Drainage Products, Inc., Middletown, Ohio. Panels for the sides and roofs provide both outside surface and structural support. They are made of 20-gage commercial-grade galvanized plate, and are phosphated ready for immediate painting. Reduction in construction labor is where Red Jacket has achieved the bulk of its savings. This view shows the bathhouse, boiler room and lamp house at No. 17 preparation plant.



Lining and Insulation

OUTSIDE WALLS in the bathhouse and shower room are lined with $\frac{1}{8}$ -in asbestos board serving principally as insulation. Where a ceiling is installed, as in an office, rock-wool bats are placed over it. This illustration shows the 24x60-ft change room, accommodating 325 men, at Pigeon Creek portal, No. 17 mine.



Erection Improvement

AN ERECTION PRACTICE devised by Red Jacket engineers is believed to be a distinct advantage. On the inside of the buildings, concrete is poured into the L-shaped steel sill on which the outside panels rest. This makes the building warmer and leaves no place for the accumulation of dirt and moisture, thus discouraging corrosion. If any moisture goes down between the concrete and the panel, it is free to drain to the outside.

Story Continues ➡



Flexibility Extends to Other Buildings

STEELOX SUBSTATION BUILDINGS installed at Red Jacket mines are 16 ft wide and long enough to accommo-

date one or more conversion units as conditions require. Two units are installed in the building at Pigeon Creek portal, No. 17 mine (left). At No. 9 Drift, Junior mine, a second building includes man-shelter room and office.



Covers and Roofs Also

COVER for mine-run bin at No. 17 mine is a structure 24 ft wide with sidewall panels 8 ft high. Consequently, it uses the same structural parts as are standard for the portal buildings. Steelox also was selected for the roof of a cinder-block cigarette warehouse for the company's stores department because it was cheaper than a frame roof and of course completely fire-proof.



Easy to Change Size

THE EASE with which a steelox building can be enlarged or reduced in size if moved to another location is another outstanding feature of the standard-steel construction in the opinion of Red Jacket engineers. Here, one of two buildings near Mate Creek portal, No. 17 mine, is a shop servicing equipment in both seams. The other building houses offices for the mine foreman, payroll clerk and assistant superintendent.

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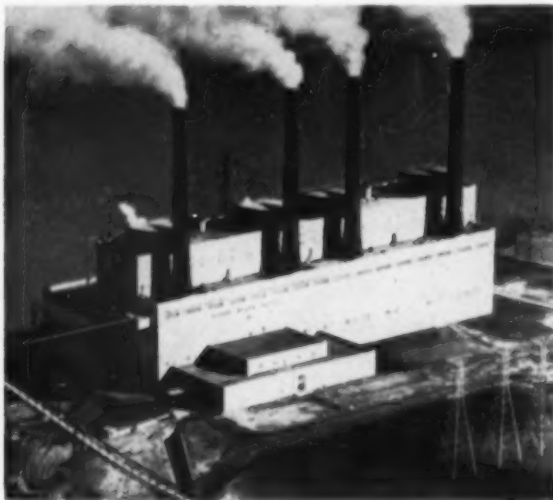
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Foremen's Forum



AT THE BIG PLANT or in the kitchen, coal's prime mission is to keep the customer happy. It's a job for every man in the industry, so . . .

All Hail the Customer!

The sole arbiter of the coal industry's health is the customer . . .

Who is he?

What does he expect?

How can you help keep him happy?

THIS MONTH'S DISCUSSION may have a disturbing effect upon the collective ego of coal's production supervisors, but that effect, if it comes, will be purely unintentional. All we're trying to do is generate more interest at the face and in the preparation plant in the questions: Who uses coal? What do these customers expect from the coal they buy? What can supervisors do to help keep these customers happy?

Getting the coal from the face to the surface is not the end of the line in coal mining. Nor is running the coal through the cleaning plant and into the railroad car. Day after day it must be sold, and that is what keeps your company in business. The end of the line, therefore, is dumping the coal into somebody's bin in return for money—preferably enough to return at least a modest profit after taxes.

You can see that it is vital for every supervisor to keep the end use of his company's coal in mind as he goes about the business of winning it underground or cleaning it above ground. We imagine the supervisor of an automobile assembly-line feels mighty close to the customers who will eventually buy the cars, and coal's supervisors must have the same concern for their customers.

WHO USES IT?

Launching into the discussion of these matters, let's take up the first question: Who uses coal?

Well, everybody uses it in some form, but let's explore some of the particular end uses.

The electric range in the kitchen of any home requires the burning of about $\frac{3}{4}$ ton of coal per year or its equivalent at the power plant, and an electric water

heater requires another $2\frac{1}{2}$ tons per year burned at the power plant. The radio uses another 150 lb per year; the refrigerator, 500 lb; the electric percolator, 100 lb; the electric iron, 150 lb; and, even, the [censored] oil-burner needs about 450 lb of coal per year at the power plant to keep it going. Up to 10 tons of coal are consumed in the manufacture of materials for a new home. Remember, we are building housing at the rate of about 1,000,000 units a year.

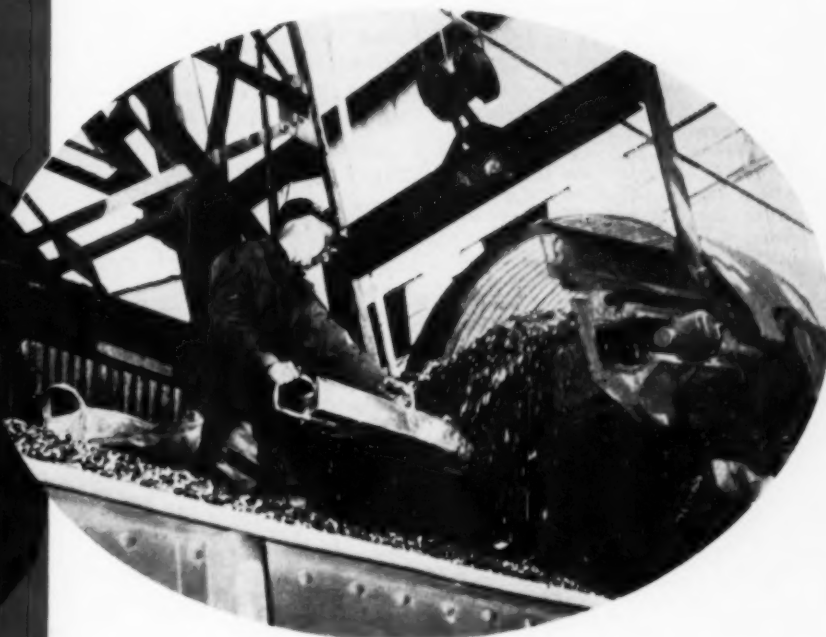
The paper upon which this is written is not so far removed from the coal face as you might think. If you set out to whomp up a batch of paper, here's about what you'd need:

- 1,500 cords of selected logs.
- 50 million gallons of pure water.
- 110 tons of salt.
- 70 tons of lime.
- 70 tons of other chemicals—and . . .

Finally, 21 million lb of steam generated by the heat from 18 railroad cars of coal. This impressive list of materials would provide a single day's work in some mills. The output would be about 2.8 million lb of paper. In all, the paper business uses about 15 million tons of coal a year.

Literally, your automobile represents

**Guaranteed uniformity of product
plus 99%+ separating efficiency!**



a "Fairmont-Built" plant is your best coal salesman

There is nothing quite so important to the successful selling of any product as uniform quality. It builds confidence among the buyers and gives added incentive to the salesman to push his product with assurance.

Fairmont-Built plants have proven their ability to deliver a uniform, premium coal which will always meet the test of car-to-car analysis.



FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

**Designers and Constructors of Complete Coal Preparation Plants Using
Both Wet and Dry Cleaning, Centrifugal and Thermal Drying**

its own weight in coal, just about pound for pound. And the nylon hosiery on a pair of shapely gams takes from 6 to 10 lb of coal in the manufacturing process.

BIG WHEELS IN CONSUMPTION

But somewhere between the coal mine and these end uses of coal are the great plants that gobble up coal in horrendous quantities. The coal that formerly was burned in the home now is burned in ever-increasing tonnages in power-generating stations. In 1952, electric utilities inhaled 106,000,000 tons and exhaled nearly a billion coal-based kilowatt-hours of energy, which we promptly consumed.

Take the steel mills. Despite the long strike in 1952, the steel industry chewed up an estimated 104,000,000 tons of your hard-earned coal—Oh, happy day. That makes 94,000,000 tons of steel and we'll use more in 1953 if we can get it.

Take the railroads. We have lost ground in the fuel end of the business, but like your automobile, each new diesel locomotive is worth its weight in coal because it's made of steel. And if they ever start making them out of plastics, we've got them on that score, too, because the better plastics are an "Adam's Rib" of the coal industry.

PLEASING THE CUSTOMER

We're wandering now. Let's get back to the second question: What do coal's customers expect in the product they receive?

In the main, the customer wants consistent quality. Here's what we mean. Your company's salesman approaches a prospective customer and, in effect, says: "We produce a coal you can use to advantage. The heating value is 14,000 Btu per lb, ash is from 9 to 10%, moisture is 6% and the ash-fusion temperature is 2,450 F." The customer asks, "How much?" So they haggle and tussle, and finally set a price.

The salesman flashes a contract, fills in the blanks and gets the dotted line properly decorated. Lo, the deal is closed, and henceforth, while the customer won't expect you to provide him with better coal than the contract calls for, you can be sure he'll not take anything worse without raising a big fuss. He'll want the coal in every car to be what the contract says it should be.

That's what we mean by consistent quality. Every shipment must test within the specifications of the contract throughout the term of that contract. (That was an easy sale he made, wasn't it?)

But suppose you begin to slip. The ash and moisture begin to creep upward and the ash-fusion temperature slumps. In all probability, he won't argue too long and he may not even ask for a price reduction. He'll just get up and quickly walk away.

You can't blame him, you know. Let's assume he is the operator of the paper mill previously mentioned. He has many raw materials to think about, and all of them must meet certain strict specifications. If your coal fails to measure up, he has a right to get his coal somewhere

What It Takes!

To work towards a healthy and progressive coal industry, our "company and other coal producers must drastically change their approach to the coal business during a period of declining consumption. From a marketing viewpoint we must concentrate on *quality and service* rather than *price*, and from an operating angle must rely on *efficiency* rather than *volume* to keep our costs competitive and in line."—George H. Love, president, Pittsburgh Consolidation Coal Co., in the company's 1952 report.

else. Coal customers go shopping, too.

In our solicitude for the harried salesman, the only other advice we have to offer is that shouted by the safe bystander as he watched the villain pursue the heroine: "Head for the roundhouse, Nellie; he can't corner you there."

In addition to being constant in quality, the coal your company places on the market must be attractively priced. It must compete not only with other fuels but also with the product of many other coal companies.

Your sales people also have a service function. They instruct customers in the technique of combustion, coal- and ash-

handling, smoke control and so on. It's all part of keeping the customer satisfied with the product you offer for sale.

HOW THE FOREMAN HELPS

Now, the third question: What can mine and cleaning-plant superintendents do to keep customers satisfied?

Back to the coal mines, men.

We think the supervisor's first mission is to help preserve the attractive price, previously mentioned. Mine and plant bosses can ensure this attractive price by putting the coal in the railroad car at a reasonable cost. Rather than belabor this point, we refer you to the article entitled "Cost Cutting Today," in the January, 1953, issue of *Coal Age*. The article tells how cost-cutting is a state of mind and how the principles of cost-cutting can be applied continually, not sporadically. It is the only way to keep your company operating with a safe competitive margin.

Good face preparation also is vital. Even in full-seam mining, there may be only one suitable horizon in which the cut should be made. Be sure the cut is where it should be, if this is the case. If cuttings are to be loaded out before the coal is shot, be sure you get the last pound of such junk out of the way. To do otherwise is to place an added load on the cleaning plant. This added load may have either of these results: Higher cleaning costs or customers' complaints.

If you use sprays for allaying dust, find out how much water you can supply before you foul up the moisture specifications. And keep your spray nozzles in good condition to get the best results with least water.

In our travels about the mines, we have met many bosses who never pass an opportunity to remove trash from the stream of coal. It is a good habit to form, for while it may not materially ease the load on the cleaning plant, it does show the boss' concern for the quality of the product. Soon, others unconsciously adopt the habit. It's a form of teaching by example where the lesson in words might be scorned.

Then you try to enlist the aid of your men in jealously guarding the coal against adulteration. As mentioned before, you can teach by example. Or you can speak of these matters when you feel that it can be done with a good chance of success.


You may have to repeat the message. Reminds us of the old preacher's general outline for all his sermons: "First, I tells 'em what I'm gonna tell 'em. Then I tells it to 'em. Then I tells 'em what I told 'em."

At the beginning, we passed a word of warning as to the effect of all this on the ego of production supervisors. We merely meant that neither the people at the mine nor at the sales office in a distant city are the Big Wheels. All are cogs. The coal salesman can't live in the coal business without your efforts, and you'd be in dire straits without him.

But the point of the whole outburst is that both of you, salesman and supervisor, must salaam to the customer. He is the sultan.



IF YOU'RE LOOKING AT THE HOSIERY, it takes almost 10 lb of coal to make a pair of nylons.



The DW10 keeps your shovels swinging

An idle shovel costs you money. But a quick-moving Caterpillar DW10 wheeled Tractor hitched to a W10 Wagon will relieve you of that headache in stripping.

The answer is in this big yellow unit's speed over rough going and smooth handling, combined with its quick dumping time. Add to this the easy loading of this Cat* Wagon, and you can't miss getting more work done each day.

The wagon was designed for your work. Besides a high windrow clearance, it has good sidehill stability. It hauls 8.9 yards struck, 14 yards heaped. And its generous size bowl provides a "can't miss" target for shovel or dragline loading.

Dumping is speeded with a hydraulic ram which puts the operation under complete control of the operator. And he can open the doors to any position to regulate dumping speed. In addition, the doors can be opened or closed at any time, whether the wagon is moving or stationary.

These units are all Caterpillar-built—Tractor, Engine, and Wagon. They are designed as a team to give you the quickest, most dependable and productive hauling you can get.

Your Caterpillar Dealer will be glad to demonstrate these durable units for you. And when you buy one, you can rely on him for quick, expert service.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

Operating Ideas

Safe Switch Guard Made From Trolley-Guard Material



YOU CAN make this kind of switch safe by . . . COVERING IT with trolley-guard material.

YOU CAN MAKE a safe cover for exposed pull-type electrical switches in a few minutes, writes Coy L. South, Benton, Ill. Here's how you do it. Cut a piece of trolley guard long enough to cover the switch with about 4 in to spare. Cut a small hole through the guard about 4 in from one end. Unscrew the rubber handle from the switch. Insert the screw in the rubber switch handle through the hole in the guard and screw the handle back into the body of the switch. This will secure the guard to the switch. Finally, fasten the other end of the guard to the backboard of the switch.

This simple guard will prevent anyone from coming into contact with the live parts of the switch.

Exhaust Fan Removes Fumes From Float-and-Sink Tests



WITH COVERS OPENED and the exhaust fan operating, William Bell pours a coal sample into the carbon tetrachloride.

CONTROLLING carbon - tetrachloride fumes during float-and-sink tests no longer is a problem with a force-ventilated work bench built by the Red Jacket Coal Corp. in a small building adjacent to the central laboratory at the Mitchell Branch tipple, Red Jacket, W. Va.

The work bench, or counter, which encloses the vats, extends to the building's end wall where a suction fan is installed to pull fumes from inside the counter and exhaust them outdoors. Two vats have been installed and room has been left in the counter for two more. When the hinged cover over a vat is open and the fan is operating, air is pulled through a 3-in space surrounding the vat. The fan has sufficient capacity to insure that no fumes escape into the room. Vats are handled by a Yale 1½-ton hoist hung on a mono-rail trolley.

DON'T HOLD BACK on any "Operating Ideas" you've successfully put to work at your property. COAL AGE will gladly pay you a minimum of \$10 for each usable item, on publication. Just tell us about your idea in your own words, enclose a photo or sketch if needed and we'll do the rest. Write: The Editor, COAL AGE, 330 West 42 St., New York 36, N. Y.



Most shock- and wear-resistant bits in the mining industry

Your mine can profit from the cutting and drilling efficiency of Kennametal Bits. Tough Kennametal tips stay sharp longer, take harder knocks than any other tungsten-carbide in the industry. Heat-treated, high-quality steel shanks give the Kennametal tips full support in severest cutting and drilling conditions.

Cutting and drilling is faster, there are fewer bit changes, power is saved, and machinery operates under less strain, be-

cause Kennametal Bits keep their hard cutting edges longer. Savings are made in parts replacement costs, power output, and maintenance expense.

Your Kennametal Representative is a man with years of actual mining experience. He'll be glad to suggest and demonstrate the right Kennametal Bit for your cutting or drilling operations. Get in touch with him today!

World's Largest Manufacturer of Tungsten-Carbide

Drill Bits, Cutter Bits, Roof Bits, Rock Bits, Strip Bits

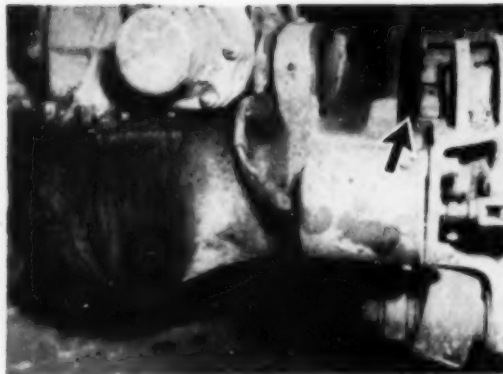
KENNAMETAL®

KENNAMETAL INC., MINING TOOL DIVISION
BEDFORD, PA.

General Offices and Main Plant at Latrobe, Pa.



TORSION ARMS, unless removed, cause stresses and strains on rear-end housing.



GAP BETWEEN SPRING and spring stop permits spring to bang against housing and to wear through housing.



VERTICAL AND HORIZONTAL steel plates, welded to housing, hold spring in place.

Reducing the Strain on Truck Rear Ends

IF YOU TAKE OFF THE TORSION ARMS connecting the frame to the rear-end housing, you reduce stresses and strains on the housing and on the rear-end gears as well, says Obie Dilldine, superintendent, Huntsville-Sinclair Mining Co., Huntsville, Mo.

In a strip-mine pit, truck frames and rear-end housing and gears often are twisted and wrenched severely, with the result that seams in the housing are loosened, bolt threads are stripped, grease leaks out and gear teeth clash and snap

off. Torsion arms, though designed and installed as standard equipment to minimize the effect of severe wrenching on driveshaft and rear-end gears, actually subject the housing to severe strains, especially in the pit.

The remedy, according to Mr. Dilldine, is to remove the torsion arms altogether. That's what he has done to the Dart trucks at his mine.

To offset the loss of torsion arms and to reduce the impact of heavy springs sliding and lurching against the rear-end

housing, a heavy 1-in steel plate is welded vertically to the axle housing in the gap between the spring and spring stop, which is on the top side of the axle housing. This plate holds the spring firmly in place and keeps it from banging against the spring stop.

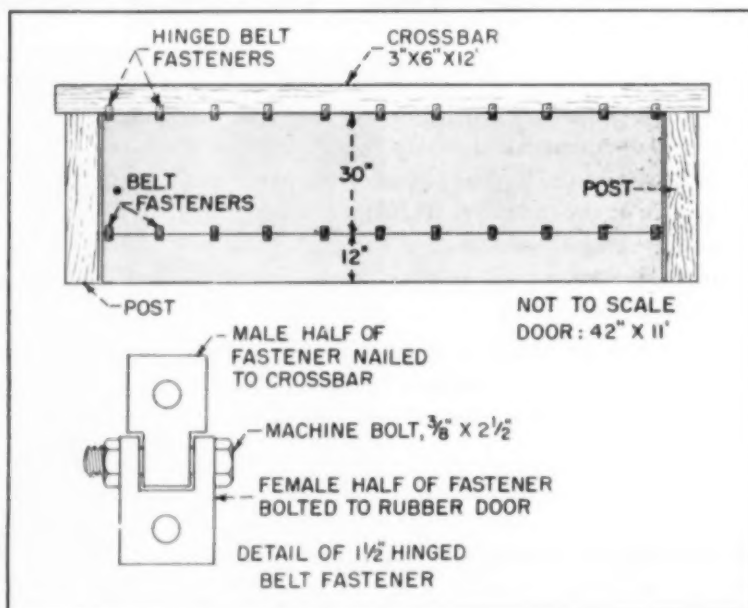
A second steel plate, welded horizontally to the top of the axle housing beneath the spring, acts as a wear plate to protect the axle housing. When these wear plates wear out they are replaced with new ones.

Rubber Doors! Another Use for Salvaged Belting

HEAVY-DUTY RUBBER DOORS for use in directing ventilating air in shuttle-car sections can be made from pieces of rubber belt, writes Rudolph Helfer, mine foreman, Loyal mine, Seanor Mining Co., Saltsburg, Pa. In a 42-in seam, Mr. Helfer says, you can use a full width of 30-in belt plus a 12-in strip fastened along the bottom of the full strip with belt fasteners. That's the way they do it at Loyal mine.

The door is hung from a crossbar by the use of Flexco hinged belt fasteners. As shown in the illustration, male halves of the hinged fasteners are nailed to the crossbar and female halves are fastened to the upper edge of the rubber door. The hinge pins are $\frac{3}{8}$ x $2\frac{1}{2}$ -in machine bolts. As the shuttle cars pass through, they swing the door out of the way and it returns to its closed position by its own weight.

Long life and low leakage are among the benefits provided by these rubber doors.



STRIPS OF RUBBER BELT, some hinged belt fasteners and a crossbar are ingredients for a rubber door in a shuttle-car roadway.



More of what you want in **CHEVROLET** Advance-Design Trucks

—and here are 4 powerful reasons why:

NEW ENGINE POWER—TEAMED WITH LOWER COSTS! The improved Loadmaster engine with a new high compression ratio of 7.1 to 1, now delivers even more power. This great engine is standard on 5000 and 6000 Series heavy-duty and forward-control models—optional on 4000 Series heavy-duty models. In light- and medium-duty models the Thriftmaster engine offers traditional Chevrolet economy.

NEW STAYING POWER—FOR GREATER DURABILITY! Frames are heavier, stronger, more durable in all 1953 Chevrolet trucks. You'll find greater ruggedness and stamina. You'll find these trucks even brawnier and sturdier than Chevrolet trucks in past years—trucks that have long been famous for those very qualities. And this heavier construction brings new comfort and freedom from fatigue to drivers, too.

NEW BRAKING POWER—FOR QUICKER, SURER, SAFER STOPS! Two types of brakes on 1953 Chevrolet advance-design trucks provide greater stopping power and greater durability. "Torque-Action" brakes are standard front and rear on all trucks up to 4000 Series heavy-duty models. Extra-large "Torque-Action" brakes in front, "Twin-Action" type in rear are on Series 4000, 5000 and 6000 heavy-duty models.

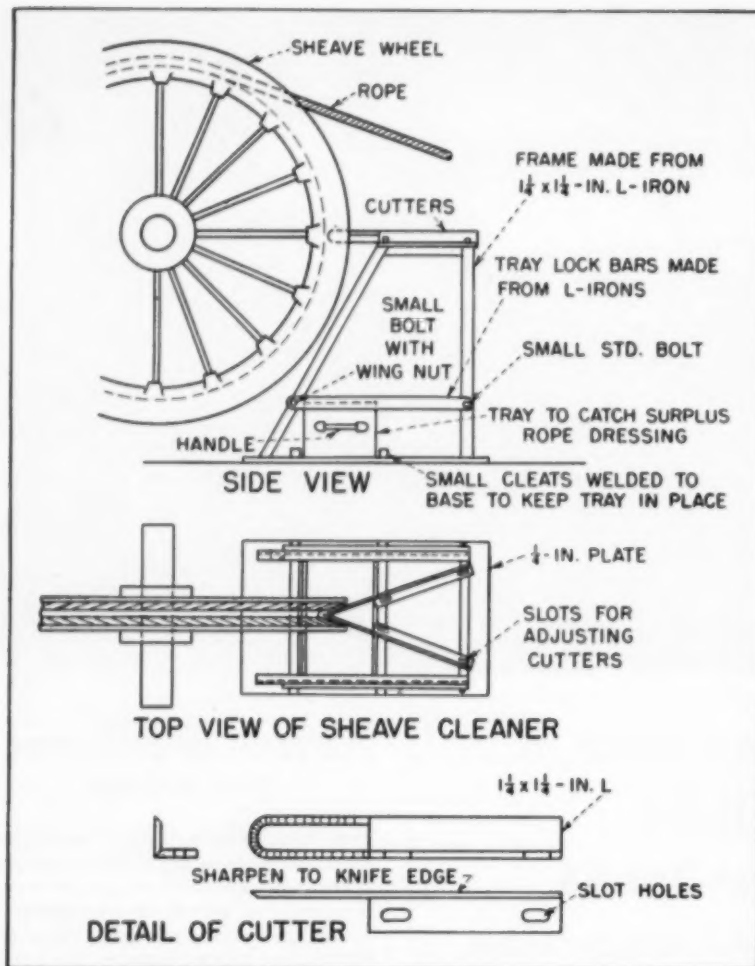
NEW ECONOMY—LOWERS COST OF EVERY TON-MILE HAULED! Expect greater economy with Chevrolet trucks. New and greater stamina with extra gasoline economy cuts operating costs, maintenance costs in heavy-duty models with Loadmaster engine. *And these great trucks list for less than comparable models of any other make!* Chevrolet Division of General Motors, Detroit 2, Mich.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.



Simply Designed Sheave Cleaner Does a Job



THIS SIMPLE UNIT for removing excess grease or rope dressing from head sheaves has given satisfactory service on several hoisting installations for more than 2 yr, writes Phil Keast, master mechanic, Empire Star Mines Co., Ltd., Grass Valley, Calif., in a recent issue of *Engineering and Mining Journal*, another McGraw-Hill publication. It can be made in a mine shop at low cost and offers two major benefits: (1) sheave grooves are kept clean at all times; and (2) no rope dressing can fall onto the headframe, coal bins or other equipment.

In making the unit, the frame holding the cutters, made from light angle iron, all welded, is bolted to the stringers supporting the sheaves. Cutters used also are made from angle iron as shown and have slot holes to permit easy and quick adjustment. When in the proper position, the cutting edges are about 1/8 in from the sides of the sheave rims, and the centers of the cutters are set on the sheave center line. Scraped-off material falls into a metal tray or box installed below the cutters. Two small cleats welded to the frame base plate keep the tray in line and two pivoted angle irons keep it securely in place so that it cannot get caught in the sheave should the rope dressing build up beyond the normal level. Small bolts with wing nuts are used to lock the free ends of the tray lock bars.

Handy Solvent Drum Speeds Parts Cleaning

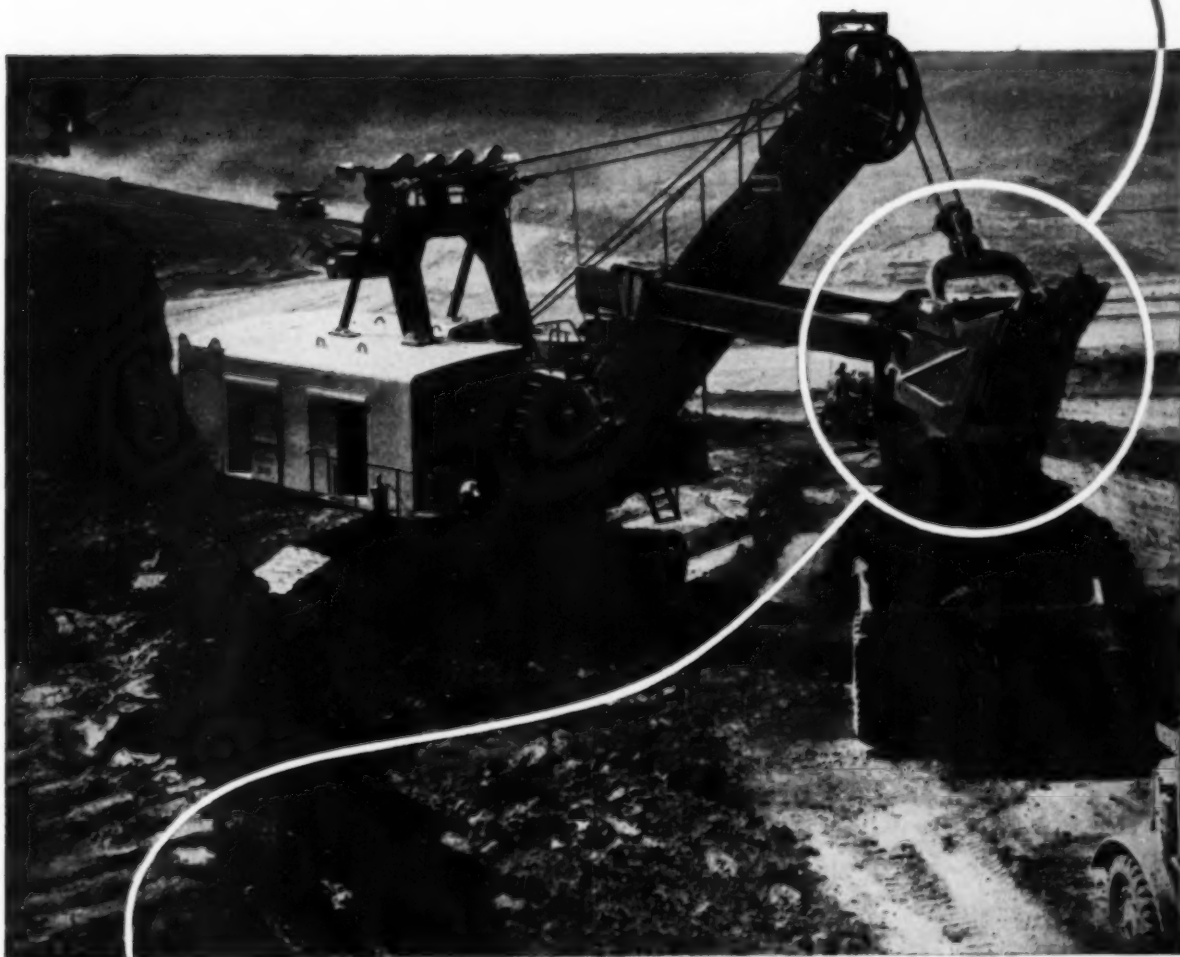


THIS HANDY CONTAINER for cleaning solvent saves time, not only because it's always ready for use but also because everyone knows its exact location in the shop, writes Bill Davis of the National Safety Council in a recent issue of *Power*, another McGraw-Hill publication.

The container is a 50-gal oil drum cut in two and fitted with a perforated tray and hinged cover. In cleaning parts, a brush is dipped into the solvent and worked into the piece being cleaned or the part is attached to a wire hook and dipped into the solution. The solvent drips through the tray back down into the drum, without making a mess on the floor. When not in use, the brush is kept on the tray and the hinged cover is closed.

IN BIG YARDAGE

YOU CAN'T
AFFORD TO BE
WITHOUT



THE MARION 191-M

World's Largest Shovel on Two Crawlers
10 Cubic Yards

with small machine cycle speed and maneuverability
Ward-Leonard Electric or Diesel Electric

MARION

POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

COAL AGE • April, 1953



from $\frac{3}{4}$ cu. yd.
to 45 cu. yds.

Equipment News

World's Largest Dump Truck Handles 60-Ton Payload (1)



Dozens of Cost-Cutting Ideas . . . for the Asking

The many new equipment items and catalogs described on this and the following editorial pages are briefed down and highlighted to save you wear and tear in spotting what interests you—new machinery that might prove useful at your property and informative catalogs you may find helpful on the job.

Use the postage-free card facing p 124 to get more information or the catalogs offered—without charge or obligation. Just circle the numbers, sign your name and address and mail.

The world's largest dump truck, capable of carrying a 60-ton payload and incorporating new principles in truck design, was put through its paces for mining men recently in Kansas City, Mo. Built for the Bagdad Copper Mines by the Dart Truck Co., the new unit was designed to fulfill the need for larger, more powerful haulage units in the mining industry.

Two 350-hp Bude super diesel engines, one mounted on each side of the frame immediately to the rear and below the operator's cab, supply the power for the 60-tonner. Each engine has an independent cooling system with radiators in the conventional position in front. Power from each engine is transmitted to each of the truck's two rear planetary axles through separate torque converters. Design permits easy installation of Cummins NHRBS 600 or Waukesha WAKDS and WAKR engines as alternate units.

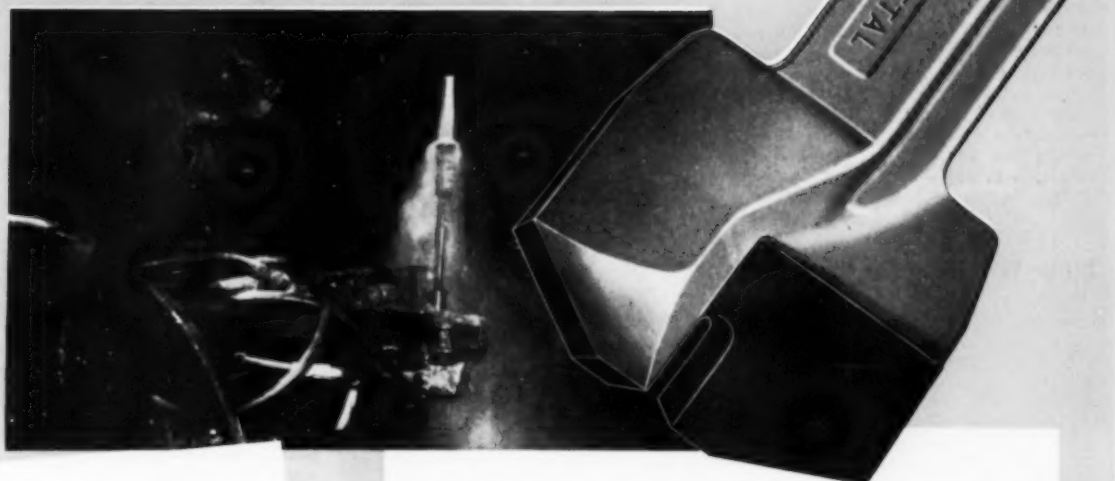
Mounting of the motors on the sides and under the belly of the dump bed offers the following advantages, according to Dart: (1) the power transmission distance is shorter, (2) accessibility permits maintenance in the field without removing motors from the truck, (3) driver visibility is greatly improved because only the radiators are in front of him and (4) driver comfort is increased because the engine heat and noise are removed from the cab area.

A hydraulic system, operated by two vane-type hydraulic pumps delivering 144 gpm of oil at 1,000 psi, is used for power steering and for hoisting the body. One pump operates from each motor so that the system will be active with only one engine running. Hoisting of the bed is by two 4-section hydraulic telescopic jacks.

Front-axle construction and suspension are said to be revolutionary in truck design. The solid axle is center-mounted on a swivel incorporating an airplane-type shock absorber and is free to turn in a manner similar to the front axle of a horse-drawn wagon. Steering power is provided by hydraulic arms located on either side of the front axle. Hydraulic steering eliminates hard physical effort by the driver and makes operation as easy as that of a smaller truck, the company states.

The new giant will go to work for Bagdad Copper Mines in Bagdad, Ariz., where its performance will be recorded and studied by operators and engineers. Five additional Dart 60-tonners will be delivered to Bagdad later this year. Circle No. 1 on the postage-free card facing p 124 for more detailed data on the Dart Model 600 from the Dart Truck Co., Kansas City, Mo.

HOW KENNAMETAL ROOF BITS HELPED BOOST PRODUCTION 25%



HITCH TIMBERING with KENNAMETAL BITS INCREASES AIR COURSE 20%

Kennametal SD 6½-inch Drill Bits are used in the Nelms Mine to drill for hitch timbering throughout the haulage ways. Four 3½ foot holes are drilled per setup and to date about 4,000 hitch installations have been made. Air course has been opened up about 20%, and safety conditions improved.

SPECIAL SLABBING METHOD GIVES ⅓ MORE RECOVERY

An unusual method of recovery is practiced by the Nelms Mine in bolted areas. Eighteen foot rooms with bolts at three foot centers are driven all the way up, nine feet are slabbed out, and timbering is done as the coal is loaded. Recovery is about ⅓ more than formerly obtained.

The Nelms Mine of the Youghiogheny and Ohio Coal Co. has tried every available make of roof bit in their extensive roof bolting program. Their records show that the Kennametal HFD Rotary Roof Bits now in use consistently deliver the best performance and service.

These tough, Kennametal-tipped bits drill 42" holes in blue slate, shale, and sandrock at rates as high as 20 holes per hour per bit, with the result that roof necks are bolted in ⅓ the time previously needed. By so improving the efficiency of roof bolting, Kennametal Roof Bits are an important factor in the 25% tonnage increase that bolting has made possible in this mine.

Kennametal offers a complete line of bits for cutting and drilling—with tips whose shock and wear-resistant characteristics cannot be matched by any other tungsten-carbide in the coal industry. Kennametal representatives—men with years of actual mining experience—will recommend the right bit for the job, and go into the mine to demonstrate the operation. Call your Kennametal representative today!

Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL 
Quality Carbide Of The Coal Industry

*World's Largest Manufacturer of
Tungsten-Carbide Mining Tools*

Three New "Lever-Action" Scrapers for Easier Loading (2)

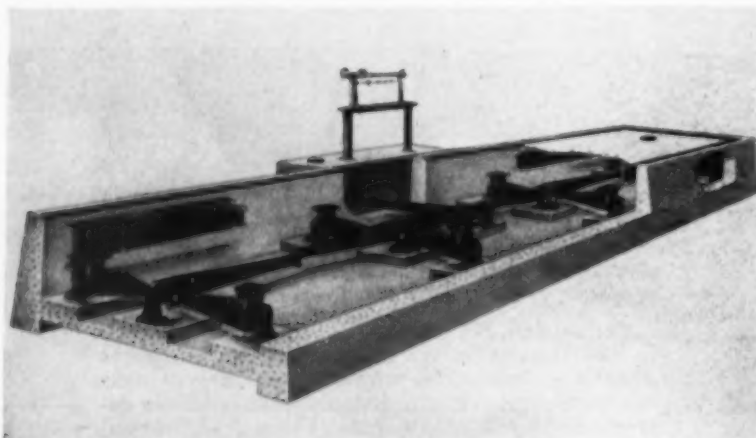
Complete line of improved scrapers announced by the Euclid Road Machinery Co., Cleveland 17, includes a new 12-cu yd model in addition to its standard 15.5-yd scraper and 18-yd twin-power unit. All three models feature a new "lever-action" design used with an improved and simplified hydraulic system that permits lowering scraper height by 2 ft, providing a clean appearance and making it easy to top the load with shovels and draglines. With levers replacing cables and sheaves formerly used to multiply the stroke of hydraulic jacks actuating the bowl lift, apron lift and roll-out ejector, about 90 ft of cable has been eliminated, controls are faster-acting and greater accessibility for servicing is provided. Identical in construction except for capacities, engines and speeds, the 15.5-yd (struck) scraper is offered with either a Cummins or GM 275-hp engine and 10-speed transmis-



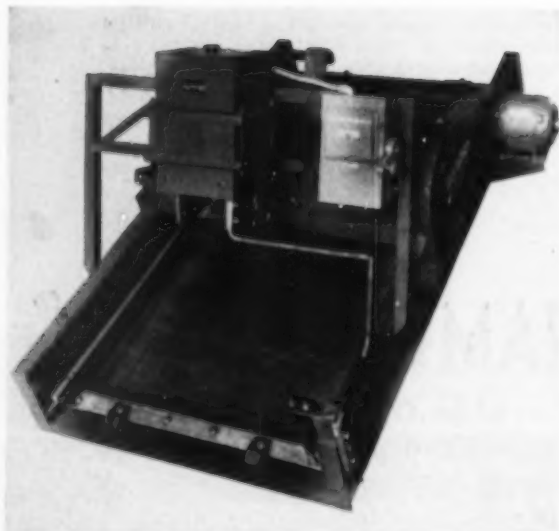
sion; while the new 12-yd (struck) unit is powered by either a 200-hp Cummins or 190-hp GM engine, with a 5-speed transmission. The twin-power 18-yd scraper, with a separate engine driving

the rear scraper wheels, is powered by either two 200-hp Cummins or two 190-hp GM engines. All models include various Euclid features. Circle 2 for full details from the company.

New Truck Scales Handle 50-Ton Units (3)



With the addition of its new four-section straight-lever ball-bearing motor-truck scales designed for weighing big truck and trailer loads, the Howe Scale Co., Rutland, Vt., now offers a complete line of truck scales. The new straight-lever design that provides optimum strength with the least weight is combined in the new unit with the Howe ball-bearing feature that saves wear on knife edges and bearings, prolongs scale accuracy and reduces maintenance, the company says. The Howe "Inside" anti-friction plates used to give proper clearances and eliminate all lateral motion are designed to prevent plates being knocked off and knife edges damaged, it points out. The four-section straight-lever scale has a capacity of 50 tons, with platforms 10 ft wide and 45, 50 or 60 ft long. A wide selection of weight indicators are available. Bulletin 678 offered by the company contains full data on the new unit.



New-Type Suspension Provides Better Screening (4)

Latest-type Leahy No-Blind heavy-duty vibrating screen, shown above with the latest design of FlexElex equipment for electrical heating of the screen jacket, utilizes a new feature in suspension of the free-swinging screen jacket at the discharge (lower) end of the vibrating screen that results in better vibration and greater flexibility in the action of the screen cloth, the maker reports. The old-style suspension bar has been replaced by a more rigid, yet lighter, structural-aluminum mounting bar, which provides improved features of suspension, and is positioned directly opposite the tensioning and free-swinging points of the screen cloth at the upper end of the screen frame. Adjustment of the screen cloth for proper tensioning and vibration is greatly simplified by the new mounting bar and its suspension, which permits no deflection in the parts mounting the screen cloth at the discharge end, the company says. Use of the FlexElex heating unit, engineered especially for fine-mesh screening of damp materials, opens up a new range of economic applications not practical with conventional vibrators, the company also points out. Full data on both units from Deister Concentrator Co., Ft. Wayne 1, Ind.



Tough, flexible Hazacord® Twin Type G.
Note the mold-cured Hazaprene ZBF Sheath
that forms a flame-resistant barrier between
the power and grounding conductors and
prevents short-circuiting.

In the rough and tough mining industry, it takes real men to operate the heavy-duty equipment . . . and rugged cable to keep it on the job.

Engineered throughout for this tough service, Hazacord® Twin mining cable has the stamina to stand up under the many punishing conditions of underground work. The tough Hazaprene ZBF Sheath — vulcanized under pressure in a metal mold — has the smooth finish, density, resistance to flame, moisture and abrasion required for safety and long life. The separately insulated conductors are each reinforced with a moisture-resistant, non-rotting open braid which locks conductors and sheath into one integral mass and prevents internal slip-

ping. Yet, with all this protection, Hazacord mining machine cable has the flexibility that adds years of extra life.

Hazacord mining machine cable is certified as flame resistant by the U. S. Bureau of Mines and the Pennsylvania Department of Mines—look for “P-104BM” molded into the sheath. For full information on the complete line of Hazacord portable cables and flexible cords used by the mining industry, write Hazard Insulated Wire Works,



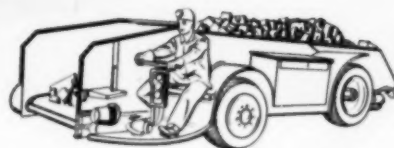
Division of The Okonite Company,
Wilkes-Barre, Pennsylvania.



HAZACORD *Mold-Cured* portable cables

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Heavier demands on all types of battery-powered haulage equipment dictate the need for batteries with greater capacity. The new Exide-Ironclad T-H battery gives 20% more capacity in the same space—WITHOUT SACRIFICE OF LONG LIFE for which Exide-Ironclad Batteries are famous.

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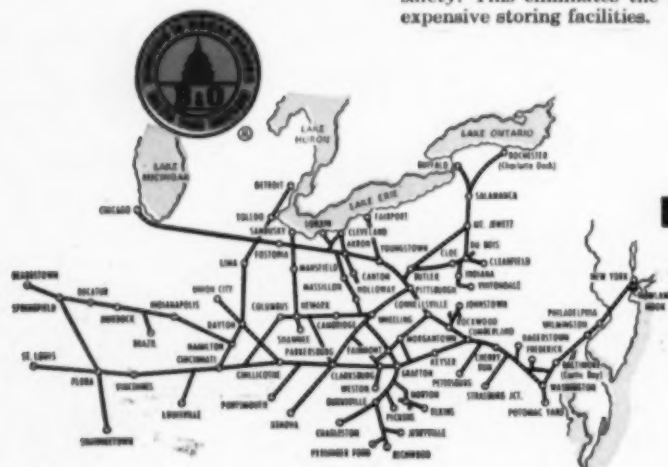
Surprising economy. Conveniently accessible and highly efficient in modern use, bituminous coal from mines on the B&O keeps fuel costs low.



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Reserves for centuries. Plants built for bituminous coal are assured a continuity of fuel supply regardless of emergencies. On the B&O alone, are reserves estimated at 25 billion tons!



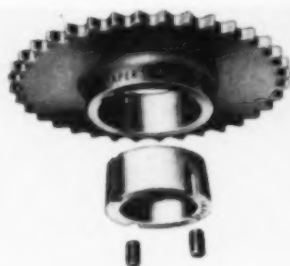
Baltimore & Ohio Railroad

Bituminous Coals for Every Purpose



New Truck Line Offers 190 Models (5)

The 1953 Ford trucks, all completely redesigned in a new approach to truck engineering, are offered in four distinct lines, in 20 new series and 190 models, and represent the broadest line in the company's 50-yr history. They range from 4,000 to 27,000 lb GVW and up to 55,000 lb GCW in the new F-900 Series (above), the largest truck ever built by Ford and an addition to the 1953 line. Outstanding features cited by the company include new "driverized" cabs that are more comfortable and roomy and have larger one-piece windshields for 55% more visibility; use of new synchrosilent transmissions on all models to eliminate double clutching; shorter wheelbases, wider front treads and repositioning of springs to make all models easier to handle and steer, more maneuverable and to provide shorter turning radius. Five engines are offered, ranging from 101 to 155 hp. Full details from Ford Motor Co., Dearborn, Mich.



SPROCKETS, ROLLER CHAIN AVAILABLE FROM STOCK (6)

Announcement by the Dodge Mfg. Co., Mishawaka, Ind., of a line of Taper-Lock sprockets and Dodge roller chain, to be available from distributors' stocks, marks the entry of the 75-yr-old power-transmission firm into the field of roller-chain drives. "Off-the-shelf" availability of roller-chain drives, by application of the Taper-Lock principle to sprockets, is an important feature of the new line cited by the maker. With Taper-Lock sprockets and bushings stocked in a range of sizes for the majority of industrial applications, costly and time-consuming reboring of sprockets to fit shafts is eliminated, as is the need for shafts to be turned and ground to get a tight fit, the company says. Taper-Lock is keyed to the shaft and grips it with the firmness of a shrunk-on fit, yet the sprocket may be easily replaced and the bushing re-used, it reports. The Type B sprockets, ranging from 40 to 100 pitch, and Dodge roller chain available for immediate delivery are detailed in Bulletin A-624 offered by Dodge.

CHANNEL-TYPE CONVEYORS FOR LONG SERVICE (7)

To meet needs for sectional-type conveyors for semipermanent or permanent surface and underground applications, Transall conveyors in channel-type construction are now offered in sections 12 ft long, with all parts interchangeable. Transall idlers, spaced to operating requirements, are the heavy-duty permanently lubricated type with either 4- or 5-in-diameter rolls. Channel side mem-



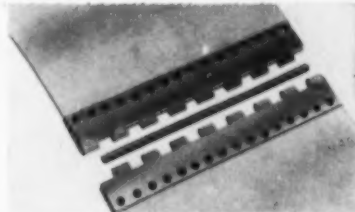
bers, furnished in either dismountable construction for portability or bolted for permanent installation, feature a hinged-type connection to the supporting chairs that permits the conveyor to conform to uneven and rolling terrain, the maker says. Optional protective deck plates are available in two types. Full details from Transall, Inc., Birmingham 4, Ala.

HOIST PHONE CONNECTS TO TRAVELING CAGE (8)

A new frequency-modulated carrier communication system for mine hoists, called the MSA HoistPhone, is designed to maintain two-way conversation between the hoisting engineer and the hoisting cage, operating with the cage at any level as well as in motion. Greater safety in shaft operations is a major feature, the company points out, since in case of cage or shaft damage while the cage is enroute, voice signals can be transmitted to the hoisting engineer instantly and in detail. Substitution of voice signals for bell or other signals makes leveling of cage for loading easier, and in hoist-inspection trips, construction work and shaft repairs, instant communication with the surface permits more precise movement, and safer and time-saving operation, it says. The HoistPhone is patterned after the MSA MinePhone used for underground haulage communication. Bulletin 1601-2 with full details from Mine Safety Appliances Co., Pittsburgh 8.

BELT SPLICERS (9)

Tennefos belt splicers, available for trough-type and flat power-transmission and conveyor belts in a wide range of widths up to 48 in., are designed for rapid, simplified installation by one man without need of special tools or drilling



holes. Unusually long wear is assured, the maker says, because the Tennefos splicer provides even distribution of strength and pointed rivets do not cut belt cords and fibers. Folder with full details from Tennefos Mfg. Co., Moorhead, Minn.



AUTOMATIC OIL SYSTEM (10)

New oil-circulating system, known as "Meterflo," utilizes the Trabon positive-piston displacement principle and is said by the maker to be a sure method of controlling the flow of oil to every bearing under pressure. Features of the system cited by the company include flow rates up to 80 cu in per minute; RTP-2000 Series rotary-type pump units available in complete range of discharge capacities; sturdy sump units, including removable baffles for easy tank cleaning; and Type MXO and MO metering valves accurately controlling flow of oil to each bearing in the system. The hi-lo pressure switch, connected to warning lights, permits ready identification of too-high or too-low pressure, blocked line and low oil supply, or will shut down the machine being lubricated. Bulletin 531 with details offered by Trabon Engineering Corp., Cleveland 3.

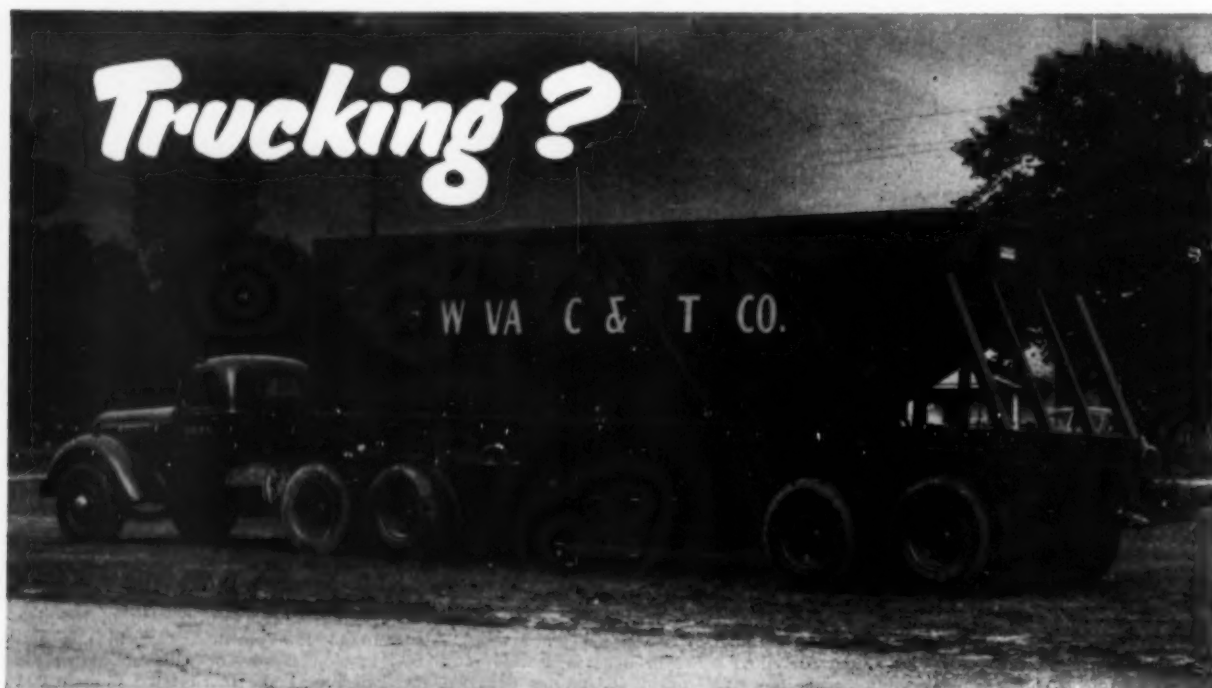


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THE BARBER-GREENE COMPANY of Aurora, Illinois used U·S·S COR-TEN and U·S·S MAN-TEN steels in this conveyor and crawler-stacker to increase strength and resist wear without increasing weight.



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IN FACT, for all mine equipment in which toughness and durability are important, U·S·S HIGH STRENGTH STEELS should be your choice.

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And what does this mean to you?

In plain dollars-and-cents talk, it means you can increase your profit ratio all the way around. Because

of these superior properties, equipment built with U·S·S HIGH STRENGTH STEELS *stays on the job* . . . lasts longer . . . does more work. Maintenance costs are lower . . . replacement costs are lower . . . and output per dollar invested is higher.

With these steels you can give each part of your equipment the particular qualities it needs to do its job best. By replacing carbon steel construction with U·S·S COR-TEN steel, U·S·S TRI-TEN steel, or U·S·S MAN-TEN steel, for example, you can increase the strength of a part without increasing its weight. Or, you can reduce its weight without reducing its strength. With U·S·S TRI-TEN steel you can also insure even greater ability to withstand shock at sub-zero temperatures. And with U·S·S A-R steel you can provide maximum resistance to wear and abrasion.

Yes, U·S·S HIGH STRENGTH STEELS can increase the performance of your equipment and save you money at the same time. Get all the facts now by writing to our nearest office.

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U·S·S HIGH STRENGTH STEEL

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2-2170

New CAT^{*} 66 HP Shovel has a bucket 8 feet wide



This is the new Caterpillar No. 6 Shovel. A glutton for work around any kind of mining job, on the surface or underground, it strips, excavates, cleans up, stockpiles, loads, 'dozes and handles haul road maintenance. Here, take a close look:

The shovel frame and tractor are welded and bolted together. This is *one* unit — big, tough and completely Caterpillar built.

That bucket is 96 in. across, scoops up 2 cu. yd. easily, and has 66 HP behind its hard-faced cutting edge of high-carbon steel. There's a 35° automatic tip-back which holds the load in the bucket, and a 50° dump angle, with impact shaking, to get rid of even the stickiest material quickly and cleanly.

The bucket is wider than the widest part of the tractor. You can work close to walls, and cut sidewalls clean, with this shovel.

Those crawler tracks are extra long and designed

especially for this unit. They're non-oscillating, too, for added stability and finer grading.

The Caterpillar-built hydraulic system lets the operator raise and dump at the same time and features an automatic kick-out. And the operator sits high and clear, with excellent visibility of the bucket's sides, back and corners. Yet the unit's over-all height (6 ft. 11 in.) is low enough for working in tight places and low over-head areas.

Your Caterpillar Dealer is anxious to demonstrate the No. 6 Shovel for you. Give him a call.

Caterpillar Tractor Co., Peoria, Illinois.

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- To assure highest quality, all stages of wire manufacture and rope fabrication are closely controlled.
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- In designing and manufacturing its thousand and one wire ropes, Macwhyte exercises all the special care that assures long service and low cost to you. May our engineers recommend the right rope for *your* equipment?

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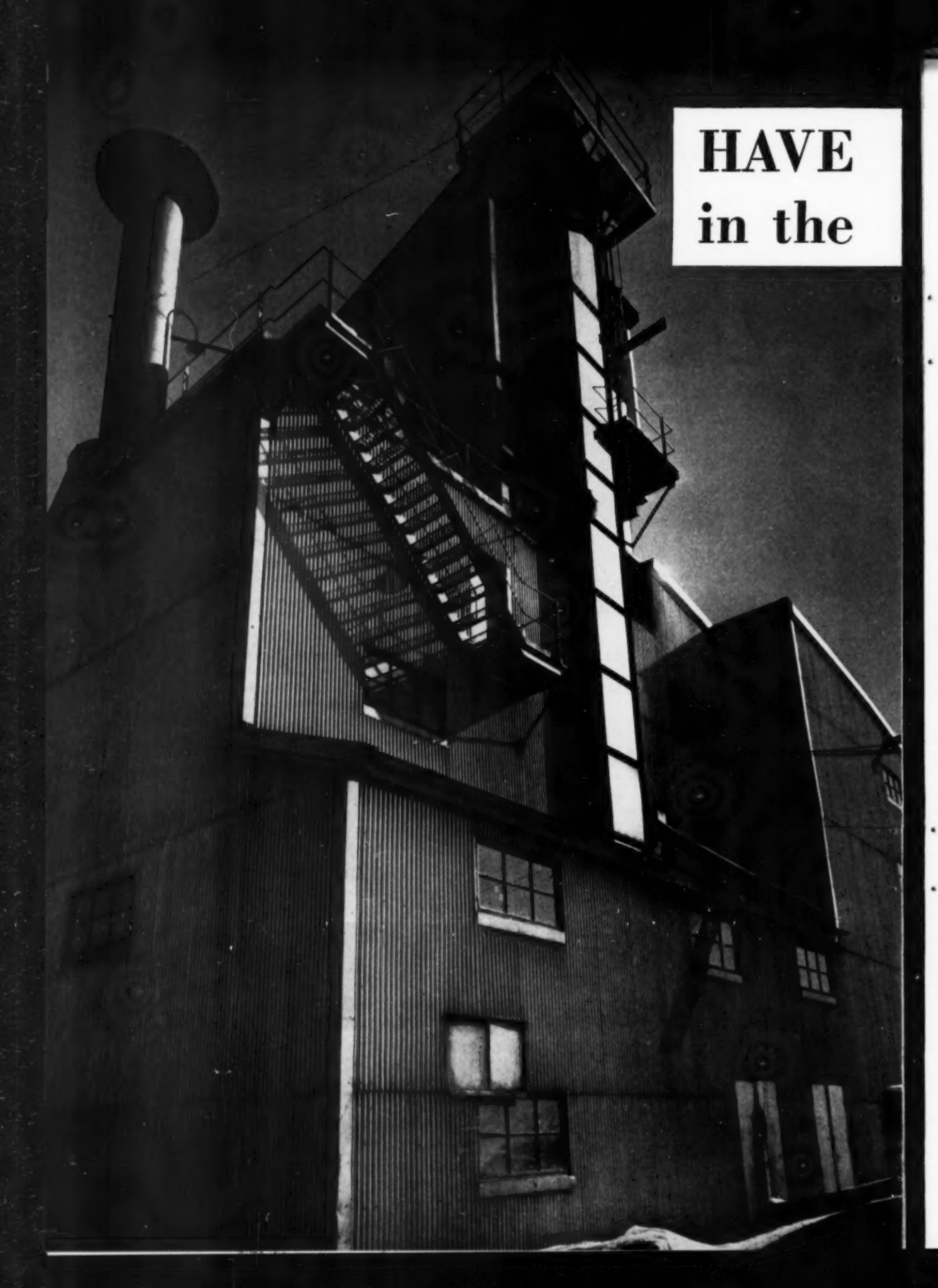
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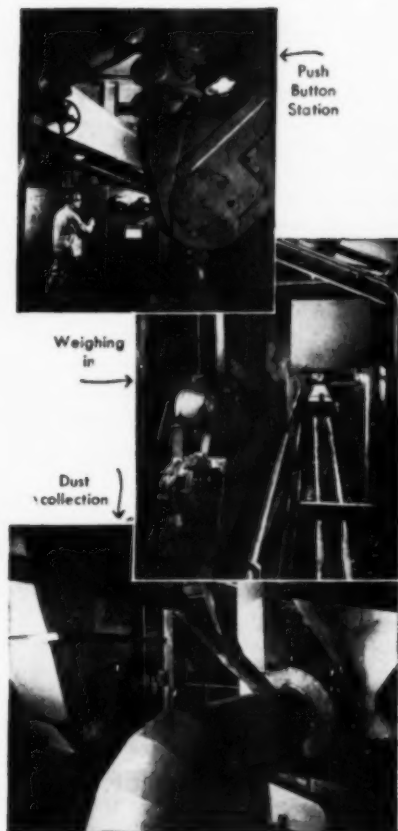
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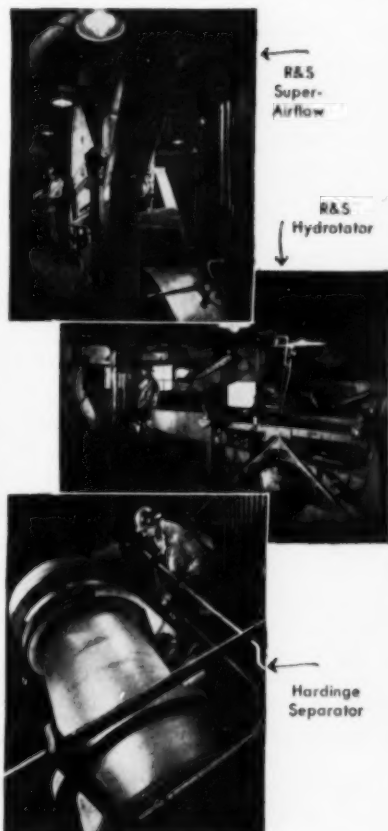
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FOR REAL HELP TO SMALL BUSINESS

It is ironic that one of the first jobs of the Eisenhower administration, so widely, and erroneously, tagged as a "big business" administration, must be to go to the relief of small business. This is necessary because the preceding administration, while continually proclaiming its tender regard for small business, actually impaired gravely the ability of small business to carry on successfully. This it did in the necessary haste of devising an emergency tax program to finance rearmament and the Korean War. Now the new administration must revise this tax structure to give small business a chance to make its key contribution to an expanding American economy.

How Taxes Hurt Small Business

Since the outbreak of the Korean War, small business has been handicapped by two principal features of the emergency tax program:

- 1) Many small firms are unable to retain enough of their earnings to provide for expansion because these earnings are drastically limited by the excess profits tax.

- 2) Small companies have received a very small share of the tax concessions allowed by the federal government to encourage construction of defense facilities.

A small business that succeeds and hence grows is particularly hard hit by the excess

profits tax. That tax, of course, applies to corporations having a net income of more than \$25,000 per year. It results in taking up to 82 cents on every dollar of profit that the company earns above what is called an "excess profits credit." For most small companies the credit depends on what was earned in 1946-49. This creates an element of gamble and discrimination in determining the amount of tax to be paid. Time has proved that it is impossible to select a base period for the tax that is fair to all companies. A young company starting in 1946-49 is peculiarly vulnerable, as its earnings in that period were necessarily low. Even on modest earnings today, it would pay a high excess profits tax.

It is true that Congress wrote into the excess profits tax law provisions to lessen the impact of the tax on growing companies. However, none of these provisions in practice has given much relief to small business.

"Relief" Provisions Give Little Relief

Small firms rely almost entirely on retained earnings to provide funds for improving their plants and equipment. They get very little help from the provisions (1) that no more than 70 per cent of total profits can be taxed away, (2) that additional earnings are allowed on an increase of invested capital or (3) that growing companies are allowed a

rate of return on capital equal to the industry average.

Most large firms can obtain additional funds in the securities market. But small firms find it difficult to increase their capital by selling securities, since investors generally prefer the stocks or bonds of nationally known and seasoned companies. Few small companies, therefore, can reduce their tax burdens by increasing their invested capital, and few can meet their needs for equity capital if their rates of profit are no higher than those of the leading companies which generally set the average profit.

Small business has been equally at a disadvantage in the matter of accelerated depreciation for tax purposes. The government has encouraged a great expansion of our industrial plant, despite the very high rate of taxation on corporate earnings, by granting certificates of accelerated amortization on new plants built to support the defense program. These certificates allow business to charge off the cost of defense plants at a rapid rate. This decreases the earnings that are subject to taxes, and so increases the part of the earnings that may be retained in the business.

Growth is Stifled

But most of these tax concessions have been made to large firms especially equipped to handle the complex problems of defense production. Of the \$12 billion of new facilities so far approved for fast amortization, only 11 per cent are for companies with less than 500 employees, although the share of such companies in the normal civilian business is about 30 per cent. In only 2 of 12 industries studied by the Small Defense Plants Administration were small firms receiving what was estimated to be a fair share of the total tax amortization awarded.

Because they are unable either to retain enough earnings after taxes or to step up their depreciation allowances, most small firms are unable to keep up in the race to expand and modernize plant capacity. The Small Defense Plants Administrator, in his report to Congress, emphasized that small companies have been unable to do their full part in the defense program for lack of capital.

The Council of State Chambers of Commerce recently published an eight-state sur-

vey showing widespread cutbacks of plans for new plants by small and medium-sized companies. According to this report, "high federal taxes enacted since the beginning of the Korean War appear to be placing an effective brake on the rate of industrial expansion in all the states surveyed and probably in the 48 states generally . . . It is principally the small and medium-sized companies whose growth is being stifled."

Some Ways to Help

The first step to relieve small companies should be to free them from the excess profits tax. The nation as a whole would be far better off if the excess profits tax were allowed to die as scheduled on June 30, since the tax promotes waste as it stifles incentives. It is quite possible, however, that the politics of tax reduction, as opposed to the economics, will prevent the elimination of the tax during 1953.

If the tax is extended, provision should be made for a much broader exemption to smaller corporations. If net income up to \$100,000 a year, which in these days still constitutes small business, were exempted from the tax, the loss of revenue to the government would be about \$175 million. This relatively small amount could easily be offset by an increase in employment and incomes if small business is freed from its financial strait jacket and allowed to expand. Careful attention should be given also to the possibilities of allowing a higher rate of return on the first \$1 million of capital (roughly the amount it takes to provide 100 jobs) and of making special accelerated depreciation allowances to smaller firms. This is a matter so important that we shall return to it in a future editorial.

Relief for small business—relief from a financial paralysis that has kept it from playing its dynamic part as a growth element in our economy—would do much to give the lie to the notion that the Eisenhower administration is a "big business" operation. Much more important, it would be a long stride toward releasing the dynamic energies of many small businesses and businessmen to forward a continuing and expanding prosperity.

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Trabon **AUTOMATICALLY
LUBRICATES 70 POINTS ON THIS
SHUTTLE CAR WHILE OPERATING
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A Trabon Automatic Lubrication system installed on this shuttle car completely eliminated costly shutdowns. After 700 hours of operation, the car was torn down and every part was in perfect working condition.

Trabon Automatic Lubrication was responsible for its smooth, efficient operation. Each of the 70 bearing points had received the right amount of lubrication at the right time.

This performance is typical of the many installations in the mining industry in which bearings are being protected by a Trabon Automatic Lubrication System.

Bulletin 529 will give you more details.

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Oil and Grease Systems

News Round-Up

Fight on Oil Imports Mapped As Independent Oil Men Act

INDEPENDENT oil producers—that is, those without foreign properties—have joined in the coal industry's fight against the flood of imported oil. Charging that excessive imports retard domestic drilling and development and hinder technological progress, representatives of 40 independent oil-producing companies at a meeting March 17, at San Antonio, Tex., adopted a resolution calling upon Congress to restrict imports of crude petroleum and petroleum products in any quarter to 10% of domestic demand in the corresponding quarter of the preceding year. The resolution declared that "the welfare and security of the United States are today imperiled as a result of the growing and unnecessary reliance on foreign sources of oil supply." By implication, the independents accused the importing companies of ignoring their pledge that foreign oil would only supplement, not supplant, domestic oil—a policy endorsed in 1949 by the Interior Department's National Petroleum Council.

Earlier, at a special meeting called March 4, at Washington, over 150 top representatives of coal operators, mine-workers, railroad-management and railroad-labor groups and small business, citing the "critical threat to the basic industries of this Nation and those employed therein," formed a permanent Foreign Oil Policy Committee and launched a high-powered drive to cut imports of residual fuel oil back to sensible levels.

Men attending the FOPC meeting named an executive committee and charged it with "securing prompt remedial action by the Congress." FOPC aim is to restrict imports of residual oil in any one quarter to 5% of domestic demand in the corresponding quarter of the preceding year. Dr. R. E. Snoberger, president, Truax-Traer Coal Co., and chairman of National Coal Association's Natural Resources Committee, was named chairman of the FOPC executive committee. FOPC also enlisted the help of regional coordinators of the Natural Resources Committee.

Meanwhile, in Congress, the imported-oil issue shaped up as another round in the foreign-trade controversy. The controversy is due for another airing in April, when hearings will begin before the House Ways & Means Committee on renewal of the Reciprocal Trade Agreements Act expiring this summer. Already, 22 bills aiming at restrictions on oil im-

ports have been introduced in the House. Nearly all of them call for the 5% limitation asked for by FOPC. In the other wing of the Capitol, Senator Cooper (R.-Ky.) is sponsor of a similar measure, which has been referred to the Committee on Finance.

Members of the FOPC executive committee, besides Dr. Snoberger, are as follows:

Dr. C. J. Potter, president, Rochester & Pittsburgh Coal Co.; C. A. Hamill, president, Sycamore Coal Co.; F. W. Earnest Jr., president, Anthracite Institute; J. N. Sherwin, president, American Coal Sales Association.

T. J. Kennedy, vice president, United Mine Workers of America; John T. Jones, director, Labor's Non-Partisan League; M. J. Alger, vice president, New York Central System; F. S. Baird, vice president, Norfolk & Western Ry.

W. D. Johnson, vice president, Order of Railway Conductors of America; J. A. McBride, vice president, Brotherhood of Locomotive Firemen & Enginemen; G. G. Burger, vice president, National Federation of Independent Business; and O. R. Strackbein, chairman, National Labor-Management Council on Foreign Trade.

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Pipe Line Successful Pittsburgh Consol Says

Experiments have proven that long-distance transportation of pulverized coal by pipe line is economically feasible, George H. Love, president of Pittsburgh Consolidation Coal Co., reported March 18. The company is "proceeding to develop the commercial aspects of providing sales outlets for it," Mr. Love said. Operating tests on an experimental pipe line installed last year at the Hanna Coal Co. Div's Georgetown (Ohio) strip mine have been concluded and the line has been dismantled for further study. No actual operating costs have been released by the company and it was understood that final cost estimates would depend on the tax treatment of the capital investment necessary. According to reports, not confirmed by the company, two Michigan utilities are actively interested as customers for the new project and



SOME 150 REPRESENTATIVES of management and labor in the bituminous and anthracite coal, domestic oil, small business and railroad industries attended this Foreign Oil Policy Conference called by the National Coal Association in Washington March 4. During the all-day discussion, the group worked out a legislative policy and established regional committees and a permanent organization to combat foreign oil competition.

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power companies in the Akron and Cleveland areas also are showing interest. Construction of the pipe line can start as soon as customers are lined up, Pittsburgh Consol officials have indicated. While the Ohio Legislature last year provided the rights of eminent domain necessary for the construction of a long-distance pipe line, actual start of the project is expected to generate considerable opposition, particularly by the railroads. Unconfirmed reports have indicated that a pipe line would trim at least a \$1 off the \$2.84 the railroads charge to haul a ton of coal from eastern Ohio to Cleveland.

Operators Seek to Form New Bargaining Group

Certain coal operators in the South and Midwest have begun informal discussions of a plan to form a new national collective bargaining organization that would be restricted solely to commercial operators, it was reported early last month. While operators said to represent an annual output of some 265 million

tons were reported by the press to have met in Chicago, it was understood that the talks were still in a preliminary stage. Another meeting, originally scheduled to be held in Washington March 18, was being planned for Chicago March 30.

The influence of captive operators in setting the wage pattern through negotiations of the Bituminous Coal Operators' Association is believed to be one of the major factors in formation of a new group. Both the Indiana Coal Producers' Association and the Illinois Coal Operators' Association withdrew from the BCOA last December to be free to conduct their own negotiations. In Chicago, Fred S. Wilkey, secretary of the Illinois operators, announced March 13 that at a meeting of the board of directors the previous day his organization had decided not to join the proposed group at the present time. "We in Illinois think this proposal has some merit" but because of the many uncertainties "we think we should wait awhile before we attempt to join any group," Mr. Wilkey said.

Another Granddaddy Mine

"I read with interest your article [p 100, March] on the 'Granddaddy Mines of America,'" writes C. A. Hamill, Huntington, W. Va.

"As president of the Upper Buchanan Smokeless Coal Operators' Association, I wish to call your attention to an error in listing the oldest mine in that field. You list the Home Creek mine. This mine is in the Williamson field, although it is in Buchanan County, Virginia. The oldest mine in the Upper Buchanan Field of Virginia is the Page Pocahontas Coal Corp. and the date of the opening was 1936. Mr. J. W. Strickler of Welch, W. Va., is president of this company."

powder, which is permitted by the Iowa mining laws.

W. Va. Supreme Court Upholds Bar on Diesels Underground

The law as written by the Legislature in 1931 clearly prohibits the use of diesel locomotives underground in West Virginia coal mines, the state supreme court ruled March 3 in a unanimous opinion upholding a decision of the Kanawha County Circuit Court. In its decision, the supreme court said that the legislature "intended to prohibit the use of petroleum as motive power in underground mines as being inherently dangerous and deleterious of the health and safety of the miners working therein." Before diesels
(Continued on p. 164)

News Briefs and Trends

Federal Review Board Upholds Bureau in Third Appeal Case

In the third appeal from a USBM ruling brought before the Federal Coal Mine Safety Board of Review since it opened for business last fall, the Board upheld an order of a Bureau inspector classifying as gassy the Glenmar No. 1 mine of the Moshannon Smithing Coal Co., in Clearfield County, Pennsylvania. During a routine inspection the Federal inspector found that an air sample from the mine contained 0.36% methane and rated the mine as gassy under provisions of the federal law which calls for a gassy classification if 0.25% methane or more is found. In its appeal to the board, the company raised the issue of due process as guaranteed by the Constitution, said that the gassy classification should not be made unless such a condition was found in more than one sample and requested the Board to take more samples. In its decision, the Board said that it had no authority under the law to require more samples and that the only question that could be considered in the appeal was whether more than 0.25% methane was actually found. According to reports, Moshannon is considering an appeal to the federal courts as provided by law. While this was only the third appeal brought before the Review Board, federal inspectors have issued 47 closing orders and 32 gassy classifications since the law went into effect, it is reported.

Iowa Senate Hits Safety Law

A resolution criticizing the 1952 Federal Coal Mine Safety Act for barring the use of black powder and asking Congress to change the law was passed by the Iowa state Senate March 19. State Sen. Elmer K. Bekman (R.,

Ottumwa) said that the federal law would increase costs so much as to make Iowa coal unmarketable. Iowa congressmen tried to have the state exempted from the law but were unsuccessful, he stated. As reported previously (March Coal Age, p 136), two Iowa coal companies have brought suit against two federal mine inspectors in an effort to challenge the federal law and prevent barring of black



Coal Men Active in Mine Rescue Group

AMONG THE PARTICIPANTS at the organizational meeting of the new Benton (Ill.) Chapter of the National Mine Rescue Association in February were: C. M. Donahue (standing, left) vice president, Mine Safety Appliances Co., Pittsburgh; H. E. Mason, superintendent, H. C. Frick mines; and Charles M. Walker, safety engineer, Chicago, Wilmington & Franklin Coal Co., and president of the organization. Seated are Thomas Tomlinson, who spoke at the meeting; John E. Jones, retired safety engineer, Old Ben Coal Corp., who was made an honorary member; William Fene, USBM; and Coy L. South, USBM, and secretary-treasurer of the group.

New Mine Developments

CF&I Opens Second Portal At New Colorado Property

Coal is now being produced from the east portal of the Colorado Fuel & Iron Corp.'s Allen mine near Stonewall, Colo., A. F. Franz, CF&I president, announced last month. "The Allen mine is the newest and most modern coal mine in Colorado and we expect to expand its operations to make it one of the largest coal producers in the Rocky Mountain area. Equipment used in the mine is of the latest design," Mr. Franz said. Coal output from the mine's west portal started last year and has been increasing steadily, he reported. The east portal, about 2 mi from the first opening, was started later and was just recently put in operation with installation of the main haulage conveyor belt. At the west portal, coal is brought to the surface in large modern mine cars. The output from both openings is crushed and loaded into railroad cars for shipment to the company's steel mills at Pueblo, Colo. More and more men are being added to the working force at the Allen mine and with the addition of that property the company has more than 1,000 miners employed in the Trinidad area, Mr. Franz said.

Consol of Ky. Sells Clover Splint Mine

Sale of the Clover Splint mine, at Closplint, Harlan County, Ky., to the newly formed Closplint Coal Co. was announced Feb. 28 by S. M. Cassidy, president, Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., Jenkins, Ky. Principal officers and owners of the new Closplint Coal Co. are Henry Shackelford, of Closplint, and Charles D. Cole, of Harlan. Pittsburgh Consol will continue as sales agent for the output of the mine. The property was originally opened in 1926 by the Clover Splint Coal Co., which was acquired by the Pittsburgh Coal Co. in 1944. Since the formation of Pittsburgh Consol in 1945, the mine has been operated by the Consolidation Coal Co. (Ky.) Div. As a result of the high quality of its splint-type coal, the 1,500-tpd mine has always enjoyed excellent operating time, according to reports. In mine safety, the operation has achieved an outstanding record, which includes 100% of all employees trained in accident prevention and first aid, lowering of the accident frequency rate to make it one of the safest mines in the country and the acquisition of numerous championships in first aid and mine rescue competitions.

Coal Show Report Coming

The May issue of Coal Age is being printed earlier than usual to give readers a chance to study the advance report on the AMC Coal Show and Convention before going to Cleveland. Watch for this special preview in next month's issue.

New Nashville Coal Mine Ships First Barge Load

The new Uniontown (Ky.) mine of the Uniontown Coal Mining Co., a subsidiary of the Nashville Coal Co., reportedly shipped its first barge of coal at the end of February. The mine is expected to produce some 2 million tons of coal annually when in full production and is reported to be the largest single river-loading coal operation in the country. Coal is being transported by barge on the Ohio River to the TVA plant at Johnson City, Tenn. According to reports, the company has coal rights to 35,000 acres in the area and the mine will eventually employ 250 to 300 men.

Single Anthracite Producer Proposed to Cut Costs \$5 a Ton

Anthracite prices can be reduced by as much as \$5 a ton by forming a single company to produce the entire output of the industry, Glenn O. Kidd, vice president of the Lehigh Navigation Coal Co., Lansford, Pa., told 250 members of the New Jersey Coal Dealers' Association at a meeting in Newark Feb. 26.

Under the cost-reducing plan, as outlined by Mr. Kidd, all anthracite companies would transfer their mines to the newly formed company, whose stock would be distributed among the present producing firms. Active management of the new single producer would be headed by four divisional presidents, two each from the northern and southern anthracite fields.

Later, speaking before a joint meeting of the Greater Philadelphia Fuel Conference and the Philadelphia Coal Club March 11, Mr. Kidd also suggested integration of coal dealers in major marketing areas, stating that that step would permit much more economical distribution of anthracite and would result in higher profits to the dealers as well as further stabilize the industry.

By operating only the most efficient and low-cost mines and producing only enough coal to meet the market demand, the new company could effect large savings by eliminating idle-day costs, such as, ventilation of underground workings, pumping, safety inspections, etc. These possible economies would add up to as much as \$75 million annually, or \$5 per ton on household sizes, Mr. Kidd maintained.

"The whole history of anthracite has been marked by continued production of more coal than the market called for," Mr. Kidd said. "With the exception of war or national emergency, the industry has consistently operated on short working time, with consequent loss of effectiveness. I am confident that adoption of this plan will be an immense forward stride for the entire industry," he continued.

The 16½-deg twin slope is some 1,600 ft long, tapping the No. 9 seam 325 ft underground. Both the Nos. 6 and 11 seams are also recoverable in the area.

Three Mines Developing In West Virginia

The United Eagle Coal & Coke Co., Summersville, W. Va., headed by Thomas T. Rees, formerly president of the Tioga Coal Corp., is currently developing a new property in the Eagle seam on Muddlety Creek, near Summersville, Nicholas County. The mine is to be fully mechanized, using conveyors for main haulage initially, and is expected to be producing 1,000 tpd of by-product coal by mid-summer, with an eventual capacity of 1,500 tpd planned. Dexter-Carpenter Coal Co., is sales agent for the property and shipments are via the

(Continued on p 160)

Various advantages for the plan were cited by Mr. Kidd. The UMWA Health and Welfare Fund would actually have a larger income, he said, since the large tonnage mined by so-called bootleg operators on which no royalties are paid would be eliminated. Nor would miners be uprooted any more by the plan than they have been under the uncertain economic conditions prevailing over past years, he stated. Retail dealers would be able to make large price reductions on household coal and be better able to compete with oil and gas. Under the plan, distribution of coal would cost not over \$3 million, saving some \$12 million over the estimated \$15 million now spent for competitive sales promotion carried on by individual companies. This saving could be spent for consumer advertising, public relations, research, development of better equipment and other steps to build up the industry, Mr. Kidd pointed out.

"We sincerely believe this plan is the keynote of an effective long-term program for the industry," said Mr. Kidd, reporting that a special call for legislation by Congress would be sought as a part of official authorization for the consolidation plan. As a part of the plan also, advisory committees representing retail dealers, the UMWA and the Commonwealth of Pennsylvania would be formed to work with the single producing company.

In presenting his proposal for dealer integration, Mr. Kidd declared that dealers are unnecessarily burdened with excessive overhead that eats up hard-earned profits. "A single source of supply in the smaller communities and perhaps as many as 10 in a major metropolitan center would allow dealers to fill their trucks as orders are taken and release valuable storage space in a dealer's yard for other business activities. Each dealer would retain his identity, and at the same time increase his profit taking," he said.

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Personal Notes



Officials Advanced by Island Creek and Pond Creek Pocahontas

N. T. CAMICA (left), since 1950 manager, West Virginia Div., Pond Creek Pocahontas Co., Holden, W. Va., has been named general manager for the company. Joseph Skiba (center), division superintendent, Rockhouse Div. of Island Creek Coal Co. since 1950, succeeds Mr. Camica, and L. G. Barber, former superintendent, Island Creek No. 28 and No. 29 mines, succeeds Mr. Skiba. Mr. Camica, joining Pond Creek in 1938, was made operating superintendent in 1940, and division superintendent, Island Creek, in 1947. Mr. Skiba joined the engineering department of Island Creek in 1930 and served in the industrial engineering and operating departments of Pond Creek until his appointment as assistant manager, West Virginia Div. Mr. Barber, first employed by Island Creek in 1932 in the engineering department, became assistant superintendent of Island Creek No. 22 mine, and in 1949, superintendent of Nos. 28 and 29 mines. Russell W. Laxson and John J. Foster have been named vice presidents of Island Creek and Pond Creek, following the retirement of H. L. Smith, financial vice president of both companies, after 44 yr of service. A graduate of the University of Minnesota, Mr. Laxson joined Island Creek in 1941 as internal auditor, and in 1950, was appointed comptroller. Mr. Foster became associated with the Island Creek accounting department in 1911, and held various positions, including general manager, until his appointment in 1949 to assistant to the president in charge of industrial and public relations.

Following the resignation of M. A. DePietro, Jr. as division superintendent of the Mudfork Div. and the recent closing of the company's mines Nos. 1 and 30, Island Creek announced March 13 the consolidation of its Mudfork and Holden Div., with R. A. Thompson division superintendent of the newly constituted Holden Div. consisting of Mines

Nos. 7, 22, 27, 28 and 29. M. A. DePietro, Sr., formerly superintendent of Mine No. 1, was named assistant to Mr. Thompson. Also, effective April 1, G. E. Marcuzzi was appointed superintendent of No. 7 mine, assisted by R. D. Ellis. Rhein Tinsley, superintendent, No. 27 mine, was named to succeed Mr. Marcuzzi as superintendent at Mine No. 22. Orville McNeil, formerly superintendent at Mine No. 26, becomes superintendent at No. 27, and is in turn succeeded at No. 26 by Jack Adams, formerly mine foreman at that mine.

Charles F. Huber, a director of Glen Alden Coal Co., Wilkes-Barre, Pa., retired Feb. 19, after 66 yr of service to the coal industry. At the age of 15, he began working in the engineering department of Lehigh & Wilkes-Barre Coal Co., advancing through the ranks to become vice president and general manager, and in 1914 was elected president of that company. In 1930, when Lehigh & Wilkes-Barre merged with Glen Alden, Mr. Huber became chairman of the board, serving in that capacity until he relinquished the chairmanship in 1947, serving only as a director. Mr. Huber was for 14 yr president of the Anthracite Institute, resigning in 1947.

William R. Moody, assistant treasurer, The Hudson Coal Co., Scranton, Pa., has been advanced to treasurer, succeeding the late John R. Atherton. Joining the company as a clerk 30 yr ago, Mr. Moody became assistant treasurer in 1947.

W. H. Bennett, safety engineer, Midvale mine since January, 1952, has been appointed safety director, Columbia-Southern Chemical Corp., Midvale, Ohio. He worked for Leckie Smokeless Coals from 1928 to 1938, becoming associated with The New River Co. in various supervisory and safety positions, and was with the Bureau of Mines prior to joining Columbia-Southern.

Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Library, Pa., has named V. D. Hanson chief mechanical engineer, and C. M. Hays chief mining engineer, sharing the responsibilities of the engineering department following the retirement of F. S. Follansbee, chief engineer.

Paul W. Beda, vice president in charge of purchasing, Old Ben Coal Corp., Chicago, has retired after 48 yr of service to Old Ben and its predecessor, Wilmington Star Mining Co. Gordon Buchanan Jr., with the company since 1922, and assistant to Mr. Beda since the close of World War II, has been named purchasing agent.

Murrell S. Reak, West Frankfort, an Illinois state mine inspector at large since 1947, last month was appointed assistant director of the Illinois Department of Mines and Minerals. Mr. Reak, who succeeded William J. Johnson, of Springfield, was a member of the state mining board from 1942 to 1947 and before that was active in Franklin County coal mines since 1918.

Harry E. Sanford, chief of the Johnstown, Pa., office of the U. S. Bureau of Mines, resigned March 16 to join the Wilmore Coal Co., a coal-lands firm, as general superintendent, with headquarters in Windber, Pa. Mr. Sanford joined the Bureau in 1942 and was named head of the Johnstown office in 1949. He began work in the mines as a boy and before joining the Bureau was superintendent for the Lillybrook Coal Co. at Beckley, W. Va.

Recent changes in the engineering staff of the Coal Div. of Eastern Gas & Fuel Associates includes the appointment of F. W. Riddle, formerly resident engineer at Wharton No. 2 mine, as assistant resident engineer at Federal No. 1. J. B. Link, Jr. formerly resident engineer at Carswell, succeeded Mr. Riddle at Whar-

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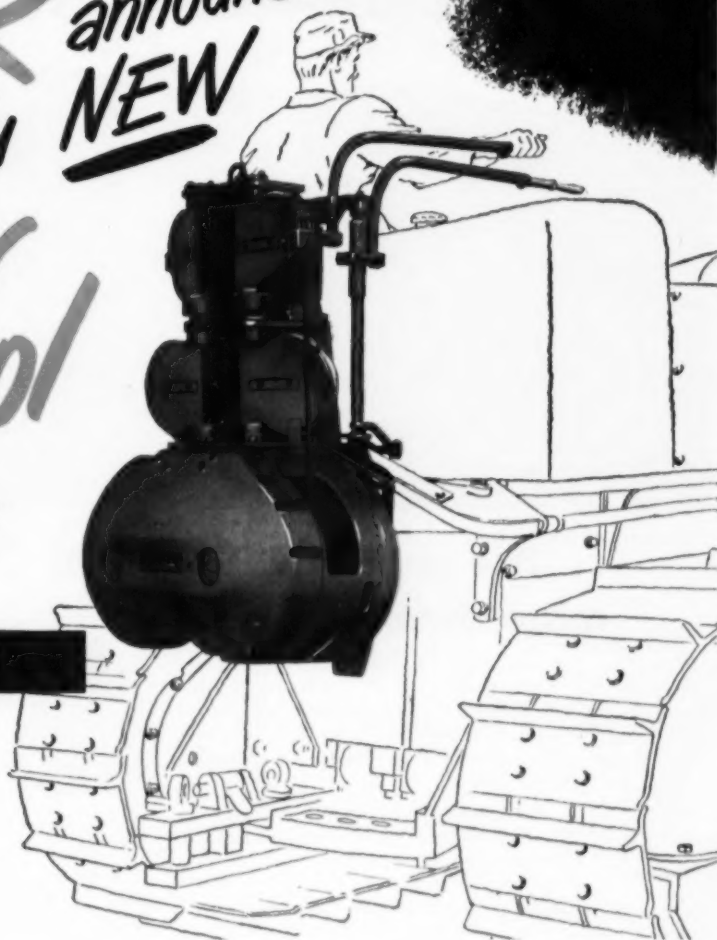
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ton No. 2 and in turn was succeeded by R. R. Snyder, formerly resident engineer at Wharton No. 1. R. H. Freeman, formerly resident engineer at Powellton No. 3, replaced Mr. Snyder at Wharton No. 1. Fred Phelps, formerly chief electrician at Wharton No. 1, has been transferred to Kopperston as a foreman in the electrical and maintenance department there. He has been succeeded at Wharton No. 1 by D. C. Wright, previously chief electrician at Powellton No. 3 mine. A. Placidi has transferred from the engineering department at the Statesbury mine to section foreman at that property. E. P. Sheriff, formerly at the Grant Town mine, has replaced Mr. Placidi. Pete Lopez, section foreman at Statesbury, has resigned to join the Carbon Fuel Co. E. L. Whitt, formerly at Powellton No. 5, has been promoted to third-shift foreman at Beards Fork.

Milo W. Summers, formerly associated with the Westmoreland Coal Co. and the Stonega Coke & Coal Co., has joined the mining engineering firm of Eavenson & Auchmuty, Pittsburgh. The organization's name has been changed to Eavenson, Auchmuty & Summers.

Establishment of an industrial engineering department to work on the development of improved methods at all company operations was announced last month by W. J. Parton, general manager, Lehigh Navigation Coal Co., Lansford, Pa. Personnel assigned to the new department include George S. Roy, who will serve as coordinator, Fred Myers, Harry Kemery, George Lovell Jr. and David Crawford.

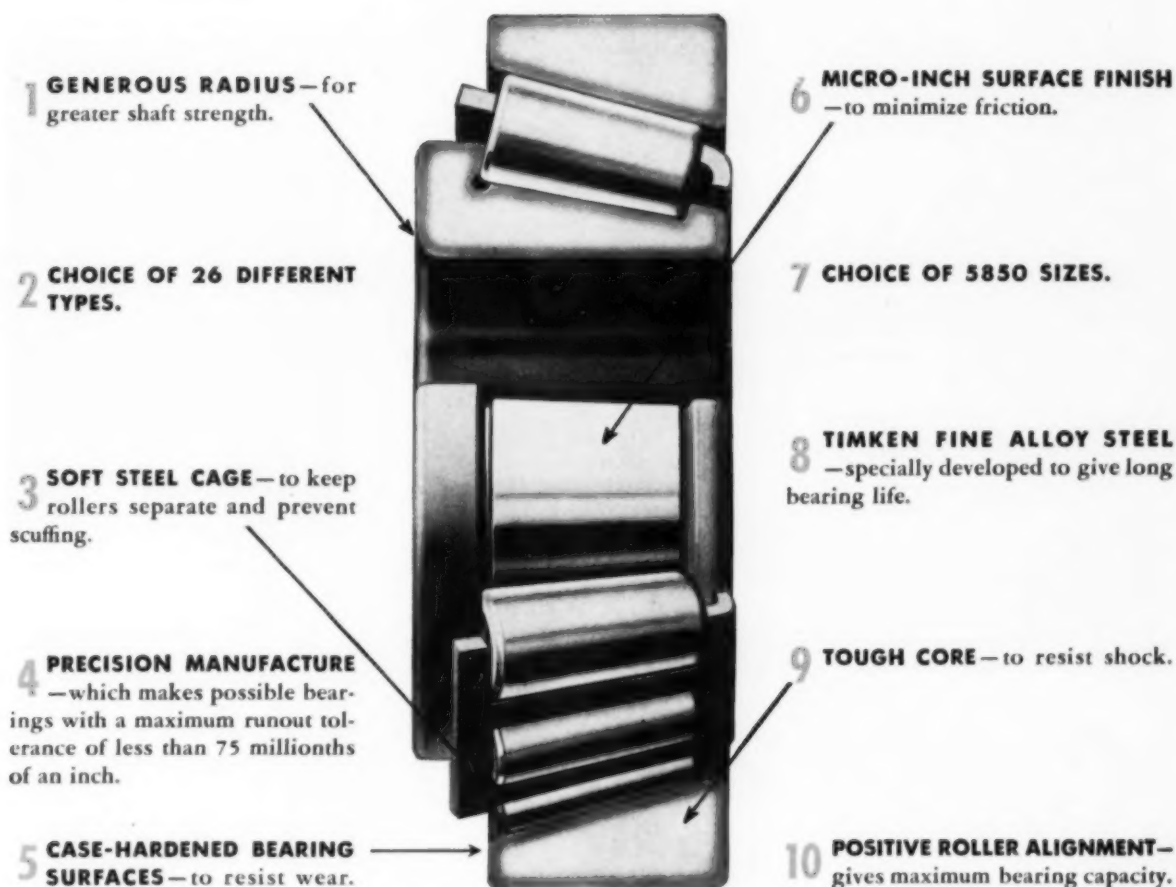
Howard Sharp, general inside foreman, No. 7 colliery, Susquehanna Collieries Div., M. A. Hanna Co., Nanticoke, Pa., has retired after 54 yr with the company and its predecessors. Mr. Sharp began his coal mining career at the age of 11, as breaker boy at Richards' colliery, progressing to driver, miner, fireboss, assistant foreman and foreman at the various mines of the company. He was advanced to his present post in 1933.

Jonathan D. Lankford has been appointed chief of Region V Fuels Technology Div., U. S. Bureau of Mines, with headquarters at Minneapolis, Minn., succeeding Alex C. Burr, who has resigned to take the full-time directorship of the North Dakota Research Foundation in Bismarck, N. Dak. Dr. Burr will continue to serve the Bureau as a consultant. Mr. Lankford, formerly stationed with the Bureau at Rifle, Colo., will have general supervision over the lignite laboratory at Grand Forks and over all fuels research in Region V.

Dr. John A. Hipple, chief of the atomic section, National Bureau of Standards, Washington, D. C., has been named director of the Minerals Industries Experiment Station at Pennsylvania State College, filling the vacancy created by the retirement last December of Dr. Alfred W. Gauger after 21 yr on the faculty. A native of Lancaster, Dr. Hipple attended Franklin and Marshall College and Penn State and received his doc-



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ASPHALT AND ASBESTOS BUILDING MATERIALS

torate at Princeton University in 1937 after graduate training in physics. Widely known for his work in mass spectroscopy and atomic physics, Dr. Hipple was associated with the research staff of Westinghouse Electric Corp. until joining the National Bureau of Standards in 1947.

Obituaries



Harry S. Gay Jr., 64, vice president and general manager, Gay Coal & Coke Co. and Gay Mining Co., Mount Gay, W. Va., died March 4 at a Logan, W. Va., hospital following a cerebral hemorrhage. A graduate of Lehigh University in 1910, he came to West Virginia in 1912 as superintendent of Gay Coal & Coke following his father's retirement from active supervision. An inventor and developer of coal mining machines, many of which have been adopted widely in mining, Mr. Gay was well known throughout the industry. He also was a member of the Logan and Williamson Coal Operators' Associations and active in many civic and community affairs in Logan County.

John Oshinskie, 48, vice president, District 9, UMWA, Shamokin, Pa., died Feb. 11 in the state hospital at Shamokin. One of the most widely known union officials in the anthracite region and highly respected by operating officials and miners alike, Mr. Oshinskie had served as district vice president since 1942. He entered the mines when 12 yr old and after service in various locals was advanced to the district board in 1935 at the age of 31.

D. H. Clark Sr., 53, president, Greenough Mining Co., Hellier, Ky., died Feb. 15, in a hospital at Pikeville, Ky. He also was co-owner of Sanders & Clark Coal Co., Home Creek, Va.

Edmund R. Grimes, outside foreman, Loree Collieries, The Hudson Coal Co., Plymouth, Pa., died March 10 in a Kingston, Pa., hospital following a short illness. Active in mining in the area for many years, Mr. Grimes had worked until he was taken ill a week before his death.

**here's muscle to
move mountains**

IN 6 YARD BITES!



LIMA TYPE 2400—The largest member of the Lima family is engineered and constructed for heavy duty service with higher dump, greater reach, and faster digging cycle.

EASY INSTANT CONTROL — Smooth, "Precision" air control of travel and operating motions lessens operator fatigue. Anti-friction bearings, reduce power robbing friction and step up efficiency.

BIG YARDAGE PRODUCER— Maximum power and fast digging cycles originate from a husky 12 cylinder Diesel engine of approved make. Equipped with torque converter power take-off.

LOW OPERATING COSTS — Truck and rotating bases are integrally cast for extra-rigidity and long life. Adjustments rarely needed on full mechanical clutches. Easy maintenance.

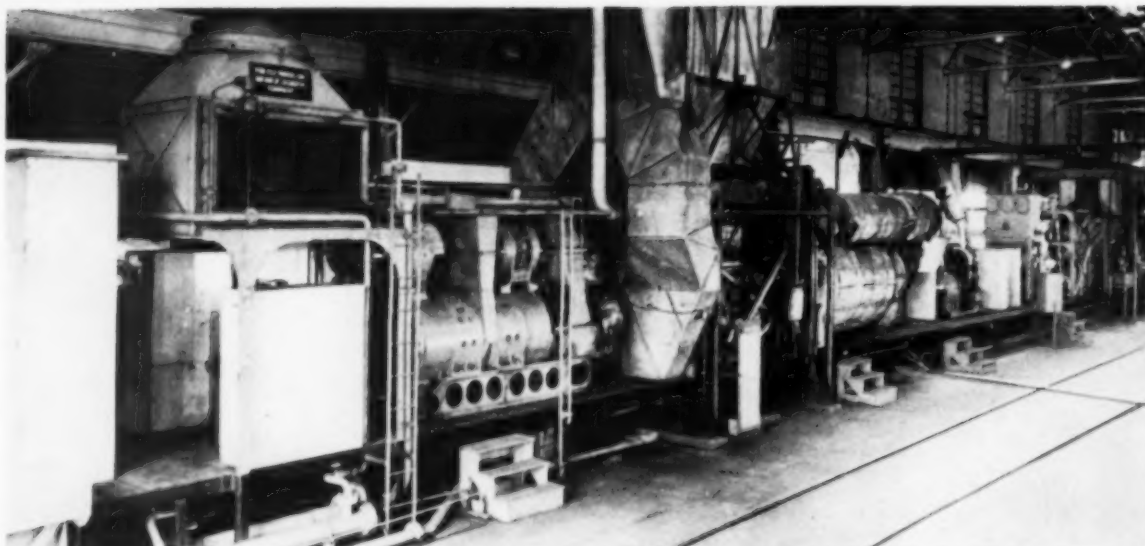
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BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Construction Equipment Division



RESEARCH RESULT—Locomotive-size coal-fired gas-turbine plant successfully passes 750-hr test in 1952. Parallel work in mining has resulted in sale of rights to two mining units to manufacturers.

More Research for More Markets

Progress, problems and needs pinpointed at Cincinnati annual meeting of Bituminous Coal Research, March 6.

Problem and Need

A. A. POTTER, president, Bituminous Coal Research—"There is a strong indication that changing conditions outside the coal industry will permit impressive growth and prosperity for the bituminous coal industry during the next few decades—if our industry is prepared to take advantage of these opportunities. . . .

"While long-range prospects are encouraging, the fact remains that for the past 40 yr, the tonnage production of bituminous coal has failed to increase materially, and has averaged 486,000,000 per year, with only temporary upswings due to wars and declines due to depressions. Yet during those 40 yr, the demand for fuels in this country has more than doubled because of industrial expansion and population growth.

"All of this increase has gone to competitive fuels, which have captured most of the increase in fuel demand by vigorous research and engineering in every phase of their business, and by aggressive merchandising policies. The bituminous coal industry has invested in its research agency, BCR, only 1/61% of its gross income, and this has included its general program as well as the locomotive-development and mining-development programs. The petroleum industry is reported to have 15,000 people working in research of value to that industry, at a cost of \$120,000,000 per year. A recent survey of the present status of coal research by J. W. Igoe and H. J.

Rose, of the BCR staff, disclosed that research on coal, its production and its use is being conducted now by fewer groups than 2 yr ago when a similar study was made. It is a fact that the bituminous coal industry is carrying on too little research in relation to its importance as a source of heat, power and chemical products. . . .

"BCR, to serve your industry most effectively, must carry on research and related activities to give maximum satisfaction to present coal users. It must be constantly carrying out technical and economic surveys, and it must maintain contacts with other industries to discover trends and opportunities for new coal markets and improved methods to cheapen coal mining and preparation.

"It must also carry on long-range research to create entirely new mining equipment, new processes and new coal markets. In addition, it must not neglect basic research to discover new facts and build a foundation for applied research. The bituminous coal industry must follow a vigorous research program with developmental and technical promotion activities to insure that research results are fully utilized in the interest of the coal industry."

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

L. C. CAMPBELL, vice president, Eastern Gas & Fuel Associates—"The American coal industry needs help to carry out its vital function in the continued progress of the Nation. Increasing reliance must be placed upon research—research that will develop more efficient machines and methods in the production of coal, research that will develop more efficient machines and methods in the utilization of coal, and research that analyzes markets, anticipates future requirements, and suggests the procedure by which research activities can be geared to the best advantage of all concerned. . . .

"Research for utilization can do more to change the economic course of any industry, including the coal industry, than any other effort. To that end, I urge that we build out of Bituminous Coal Research, Inc., the type of organization that will help coal find its place economically in the business world. Those who should be brought together to plan for the necessary steps and support to achieve this are:

- "1. The producer.
- "2. The railroads and water-transportation facilities.
- "3. The coal-land owner.
- "4. The domestic distributor.
- "5. The power industry.
- "6. The by-product and blast-furnace-coke industry.
- "7. The chemical industry.
- "8. The federal and state governments—of the coal-producing states in particular.
- "9. The National Coal Association."

Gas-Turbine Developments

WALTER J. TUOHY, president, Chesapeake & Ohio Ry.—“With a \$1,000,000 fund, a five-year program to develop a coal-burning turbine-electric locomotive got under way in 1945. In 1952, a 750-hr test on a locomotive-size assembly was completed in August, using an Allis-Chalmers turbine.

“Components were inspected by the steering committee and representatives of the American Locomotive Co. Blade erosion indicated that more work was needed on ash removal. Following this inspection, American Locomotive proposed to the Locomotive Development Committee that the program be continued on a cooperative basis. Alco offered to assume a major portion of the expense of future tests and to assume responsibility for future development of the turbine and locomotive. They proposed to carry forward this development on their own, closely integrating it with the developments of the Locomotive Development Committee. The committee unanimously accepted Alco's offer and authorized additional funds to continue the work. To date, over \$4,000,000 has been spent. . . .

“We must remember that when we entered into this venture in 1945 we realized that success of the project would mean cutting the 100,000,000-ton railroad-fuel consumption down to about 35,000,000 tons a year. Let's face it: this lost market for coal is gone for good. Our problem is the remaining railroad-coal market. It can be retained—or stated more realistically, recovered—some years hence by replacement of diesel power with coal-burning turbines. . . .

“The continued interest of all of us in carrying forward this research and development project is vital to its success.

Directors Elected

Seven “Class B” directors were elected or re-elected by the membership of Bituminous Coal Research, Inc., at its annual meeting March 6. Re-elected were:

L. C. Campbell, vice president, Eastern Gas & Fuel Associates.

George Duglinson Jr., Norfolk & Western Ry.

M. L. Patton, vice president, Truax-Traser Coal Co.

Joseph Pursglove Jr., vice president—research and development, Pittsburgh Consolidation Coal Co.

J. E. Tobey, president, Appalachian Coals, Inc.

R. B. Williamson, vice president, Eastern Coal Sales Co.

Newly elected was Henry C. Woods, vice president and chairman of the board, Sahara Coal Co., replacing B. R. Gebhart, vice president, Chicago, Wilmington & Franklin Coal Co.



Sherwood Honored for Research Leadership

ROBERT HARTLEY SHERWOOD, president, Central Indiana Coal Co., Indianapolis, Ind., and a strip miner since 1912, was presented with the first Annual Award of Bituminous Coal Research, Inc., at the annual meeting in Cincinnati March 6. The award was established to stimulate technical progress in the bituminous coal industry, and is an annual citation honoring one or more persons for outstanding leadership contributing to the progress of



industry-sponsored coal research. The citation is awarded for exemplary achievements in promoting coal-research support, utilizing BCR research results to expand markets, or otherwise contributing to the progress of the bituminous coal industry through a BCR activity. Mr. Sherwood has served continuously as a member of the BCR board of directors since its establishment in 1934, and was interim president in 1950.

The building of a practical coal-burning gas-turbine locomotive will not only improve railroad efficiency and hold coal consumption against other fuels. It will open up an entirely new field: the application of the coal-burning gas-turbine power unit to stationary plants and the consequent consumption of coal in large quantities. This is a new fuel market with limitless opportunities.”

JOHN L. YELLOTT, director of research, and PETER R. BROADLEY, assistant director of research, Locomotive Development Committee—“The major achievement of the Locomotive Development Committee in 1952 was the completion of a 750-hr high-temperature test of the world's first complete coal-burning gas-turbine power plant. Ordered by the committee from the Allis-Chalmers Mfg. Co. in 1946, long before the details of coal-handling or combustion equipment had been determined, the power plant was installed during 1951 in the Dunkirk (N. Y.) plant of the American Locomotive Co.”

Earlier tests at a lower temperature with a Houdry turbine showed that blade erosion, the major problem, could be prevented by a highly efficient multitube flyash separator. The preliminary 178-hr test of the Allis-Chalmers unit showed that the new separator could protect the 4,250-hp turbine as long as the indi-

vidual separator tubes functioned properly. This preliminary test was conducted with a pilot oil-burner in each combustor.

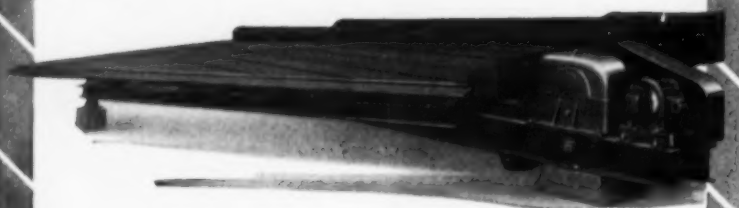
“The 750-hr test was undertaken to determine the effect upon the turbine and other components of operation for long periods at temperatures above 1,200 F and loads above 3,000 hp. The committee also stipulated that no oil was to be burned during the hours credited to the 750-hr goal.

“Elimination of the oil pilot flame required further development of combustion equipment, but a burner-combustor combination was found which operated with no oil whatever over the entire range without blowing out at high loads or flashing back at low loads. A new coal pump was built which could supply the maximum fuel requirements—more than 4,400 lb per hr.”

The 750-hr test began Feb. 4, 1952, proceeding in 188 periods of up to 24 hr. In the first 2 mo, the plant reached its rated capacity of 3,750 hp nine times. On March 6, 1952, it operated at 4,250 hp for more than an hour, showing that coal could fuel the plant as effectively as oil in the acceptance tests. The coal was high-volatile Pittsburgh No. 8—effective heating value at 1,300 F, 12,200 Btu; 4.25% moisture; 7.5% ash; 2,100 F ash-softening temperature.

(Continued on p 144)

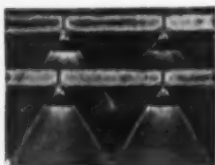
Meet Market Competition with Super Duty Coal Washing Efficiency



Washing of coal in fine sizes for modern markets demands the extraction of every possible impurity . . . and the last cent of profit.

SuperDuty Diagonal Deck Coal Washing Tables, singly or in batteries, meet today's challenge with higher tonnages of quality products, less coal lost in the refuse and lower production costs.

SuperDutys unquestionably represent the peak of cleaning efficiency. Anything less puts you in an unfavorable competitive position. That is why practically every important new installation of recent years has included SuperDutys in any count necessary for handling the complete range of fine coal washing requirements. Send for Bulletin 119.



CONCENCO SPRAY NOZZLES

These handy nozzles are simple, flexible and economical. All you do is drill your holes, clamp on and get results. They can be definitely aligned for washing, sluicing or spraying according to need. They are removed or replaced in a moment's time.

THE DEISTER ★ CONCENTRATOR COMPANY

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COMING MEETINGS

19th West Virginia Safety Conference: Meetings of Mines and Mining Section, 2:30 and 7:30 pm, April 22, Charleston, W. Va. Details from C. L. Wilson, New River & Pocahontas Consolidated Coal Co., Minden, W. Va.

Eleventh Annual Anthracite Conference: May 7-8, Lehigh University, Bethlehem, Pa.

American Mining Congress: Coal Convention and Exposition, May 11-14, Cleveland, Ohio.

Rocky Mountain Coal Mining Institute: 49th meeting, June 28-July 1, Colorado Hotel, Glenwood Springs, Colo.

BCR MEETING . . . From p 143

Average load was 2,760 hp. Average fuel rate was 1.03 lb per hp-hr for an average thermal efficiency of 18.7%. Best efficiency was reached at about 3,000 hp—0.95 lb per hp-hr, or slightly over 20%.

A separator leak resulted in considerable erosion of blades, and was followed by separator malfunction at other times in the test, with resultant blade erosion. Foreign matter in the coal also gave trouble, leading to the conclusion that "a coal-fired gas-turbine locomotive should be supplied with a prepared fuel from which all nuts, bolts, railroad spikes, etc., have been eliminated."

There was no ash deposit of any consequence on the turbine blades and the dust discharge was 0.2 lb per 1,000 lb of exhaust, well under the 0.85-lb limit in most ordinances. The coal pumps stood up well and provided good control of the feed rate. The ring-supported combustors came through the tests in excellent condition, and combustion efficiency was consistently above 95%. No oil was used after the flame was established.

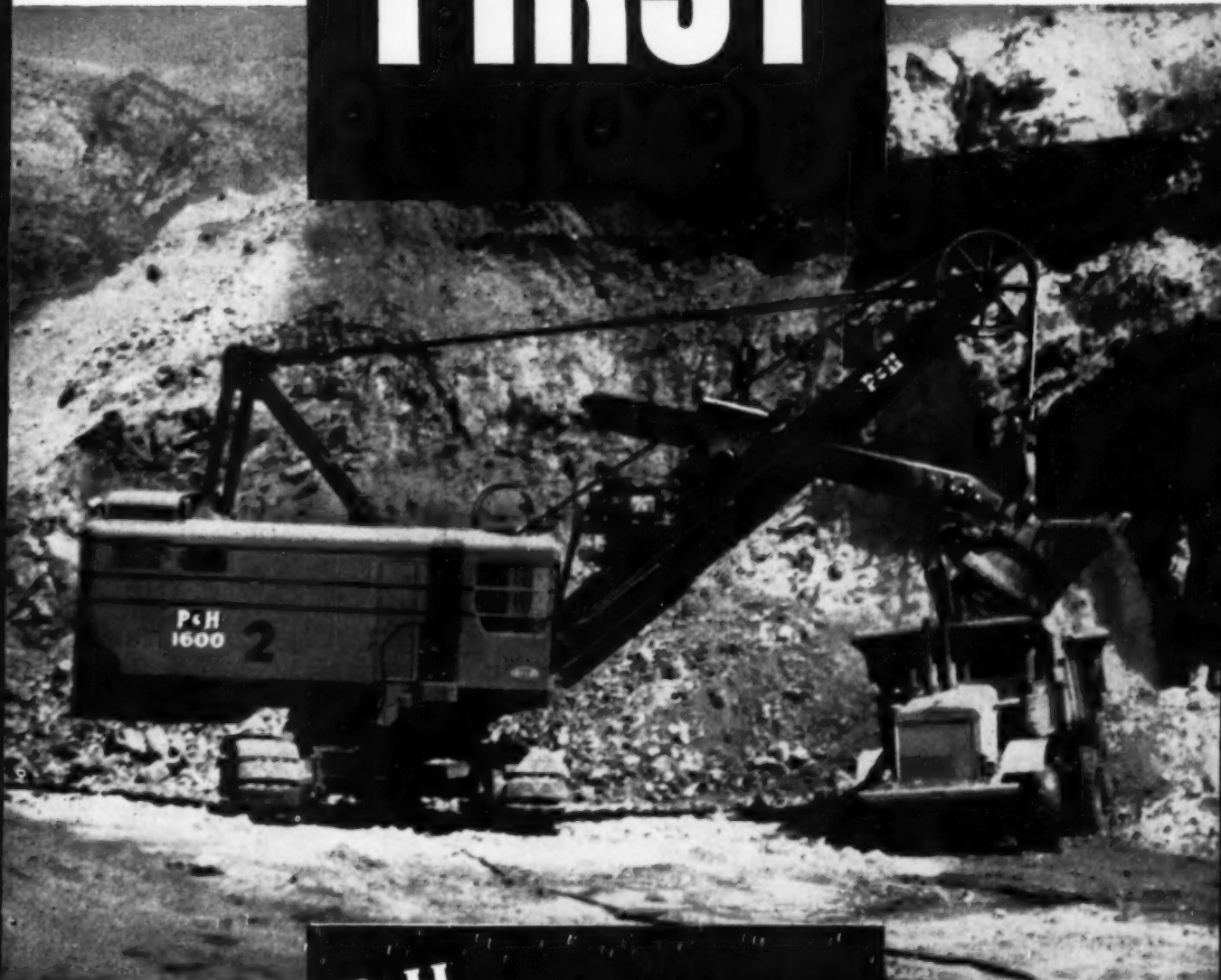
"LDC's program now is being concentrated on the remaining problem of maintaining top separator efficiency at all times. There is every reason to believe that the goal will be achieved as a result of the cooperation between the American Locomotive Co. and LDC."

With W. A. Callison representing the American Locomotive Co., Mr. Potter signed the contract for continued LDC cooperation in the development program following Mr. Tuohy's presentation. It involves funds of \$490,000.

Mining Development

L. NEWTON THOMAS, president, The Carbon Fuel Co.—"Modern coal-preparation plants are doing much to deliver what the customer wants, yet much remains to be done if we are to produce a product to compete with certain features of our competitors—oil and gas. Barring car shortages and strikes,

FIRST



P&H

The first thing you see when you look into P&H Electric Shovels is new ideas—ways of doing things differently. *Differently and better!* For P&H engineering concentrates on one thing . . . cutting your production costs!

The result is evident in electrical equipment designed and built by P&H—especially for the purpose—not adapted for it. Stepless power regulation gives you the smoother flow of power without multiple contactors to cause trouble and replacements. There's Magnetorque® Hoist Drive, vertical swing motors, independent propel, powerful worm crowding mechanism with separate crowd motor, air-filtered cab. And there's the all-welded strength of rolled alloy steels to take year-in, year-out punishment.

P&H leadership in electric shovel development gives you leadership in all kinds of open pit work . . . lower tonnage costs! That explains why every third P&H Electric Shovel sold is a repeat order. Get the facts.

*T. M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H LARGE EXCAVATOR DIVISION
HARNISCHFEGER
CORPORATION

MILWAUKEE 46, WISCONSIN

the **P&H** *Line*



TRUCK CRANES



DIESEL ENGINES



POWER SHOVELS



PREFABRICATED HOMES



ELECTRIC HOISTS



DOZERS



WELDING EQUIPMENT



OVERHEAD CRANES

It's Easy to See



PLASTEX *Yellow* PIPE *is safer*

There's no mistaking PLASTEX Yellow pipe—it's easy to distinguish, easy to trace . . . provides maximum protection against accidental damage or becoming fouled with other equipment.

always visible

PLASTEX Yellow pipe fairly glows in dark mine passages—never loses its striking identity. Color goes all the way through, won't fade or stain and resists dirt accumulations.

longer lasting

In addition to the proven advantages of lightweight, flexibility and guaranteed service against rust, rot and corrosion, PLASTEX Yellow pipe lasts even longer with less maintenance because it practically eliminates the risk of damage caused by poor visibility.

The PLASTEX Pipe & Extrusion Co.
Columbus 3, Ohio



Specify PLASTEX *Yellow* for better, safer mine piping.

See the PLASTEX display at the Coal Show—Booth No. 340

EQUIPMENT APPROVALS

Eleven approvals of permissible equipment were issued by the U. S. Bureau of Mines in February, as follows:

Jeffrey Mfg. Co.—Type MT-66 cable-reel shuttle car; three 10-hp motors, 250 v, DC; Approval 2-902; Feb. 2.

Goodman Mfg. Co.—Type 120 Conway shovel; one 25-hp and one 10-hp motor, 200 v, AC; Approval 2-903; Feb. 3.

Joy Mfg. Co.—Type BF-212 double-drum hoist; 30-hp motor, 220 v, AC; Approval 2-904; Feb. 3.

Worthington Corp.—Type 21/8x2-in KAB pump assembly; 1-hp motor, 220 v, AC; Approval 2-905; Feb. 5.

Joy Mfg. Co.—Type WL82E Model 40 air compressor; 40-hp motor, 250 v, DC; Approval 2-906; Feb. 11.

Joy Mfg. Co.—Type 30BU1-E loading machine; two 25-hp and two 10-hp motors, 250 v, DC; Approval 2-907; Feb. 11.

Joy Mfg. Co.—Types 8SC1PE-1 and 8SC1PX-1 cable-reel shuttle cars; four 7½-hp motors 250 v, DC; Approval 2-908; Feb. 12.

Mine Safety Appliances Co.—Bantam rock-dust distributor; 2-hp motor, 220 v, AC; Approval 2-909; Feb. 13.

Joy Mfg. Co.—Type 30BU2-E loading machine; two 25-hp and two 10-hp motors, 250 v, DC; Approval 2-910; Feb. 16.

Dooley Bros.—No. 6600 coal-drilling machine; three 5-hp, two 2-hp and one 7½-hp motors, 250 v, DC; Approval 2-911; Feb. 20.

Joy Mfg. Co.—Type WL80B Model 75 air compressor; 75-hp motor, 440 v, AC; Approval 2-912A; Feb. 25.

the railroads can deliver the product when and where the customer wants it.

"However, furnishing the product profitably—and at a price the customer is willing to pay—is, apparently, another story. While we have made gradual progress, taking such machines as the manufacturers bring out and trying to adapt them to our mining processes, many large blocks to tonnage have been lost by the coal industry in recent years—not because of any inherent lack of qualification in coal but because it costs more than adequate substitutes.

"There are two reasons for this. First, the cost of transportation has steadily increased. . . . When you consider that freight accounts for an average of 39% of the delivered price of coal, the importance of this factor on future markets can hardly be overemphasized.

"The second factor in delivering the product at a price the customer is willing to pay is, of course, the cost of removing coal from the seam, processing it, and loading it into railroad cars. . . .

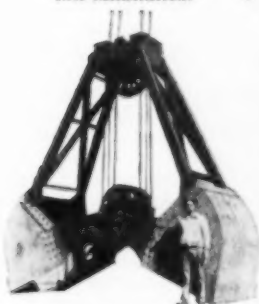
"It seems to me that in recent years

Wellman will build it

Special Cranes
Ore Bridges
Gas Producer Plants
Charging Machines
Forging Manipulators
Car Dumpers
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

→ **Wellman ore and coal
handling bridges**
give fast and efficient operation

One of two 6-ton Coal
Handling Bridges in
this installation.



6-ton Wellman Williams
Type Coal Bucket used with
these bridges.

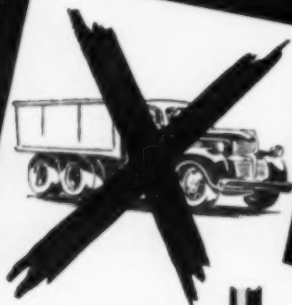


● Take advantage of Wellman's long experience in designing and building handling bridges of many types and capacities. Your selection from the complete line will provide fast and efficient handling of coal or ore. Wellman equipment, in service the world over, is recognized for its long life and dependable service. It is backed by more than half a century of engineering experience.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

**EASIER
DISPOSAL
of silt,
coal refuse!**



MORRIS TYPE R SLURRY PUMP

**Saves you the high cost
of trucking refuse away!**

In coal washeries and processing plants, Morris Pumps have been saving coal operators thousands of dollars in waste disposal operations. They eliminate expensive truck maintenance . . . trucking labor . . . and in many cases, they eliminate the building of roads for trucks to travel.

**Morris pumping installation is
simple in design . . . low in cost**

Morris furnishes pumps of various types depending upon the operating conditions . . . type of refuse to be handled . . . static discharge head . . . length of pipe line through which refuse is discharged.

Morris also recommends the size of piping best suited for the job. Pipe laying expense can be kept at a minimum by using light weight abrasion resisting pipe, easily and quickly coupled . . . easily moved . . . suitable for uneven terrain.

REDUCE YOUR OPERATING COSTS—NOW!
Morris Pumps are ideally suited to the removal of fine silt and other types of refuse. They're easy to install . . . easy to maintain . . . easy to dismantle.

Write today for full information. Read how Morris' wide experience of 83 years in building and installing pumps and dredges can save you money and refuse disposal headaches. We'll also send you names of mines now using Morris installations.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS Centrifugal Pumps

we have been meeting our adversaries with purely defensive strategy. When cheap oil invades our coasts, we go after legislation to limit it. As gas spreads farther and farther from its points of origin, we try to stop it by an appeal to the FPC. I am not criticizing this action. It is desirable but not enough. If we lose these political and economic battles we have nothing to fall back upon because we have done too little to strengthen our competitive position by better methods and equipment.

"What are the possibilities for meeting these challenges? Are they real? And what has the industry done to take advantage of the possibilities. It seems to me that we have not done enough compared to the opportunities for doing much. Over the period 1948 to the present, a little over 4 yr, the mining development program has received from direct subscriptions from the industry an average of \$125,000 per year, or 29/1,000c per ton of production."

The total from all sources is \$662,-046.17, including licensing fees for the extensible shaker conveyor and the BCR miner.

Investment in the extensible shaker conveyor was \$20,000; possible savings, 15c per ton where applicable; possible industry savings, \$22,500,000 per year in a 500,000,000-ton year.

The BCR miner may save as much as \$1 per ton. If the saving was only 50c per ton, the total on 300,000,000 tons of deep production would be \$150,000,000 annually.

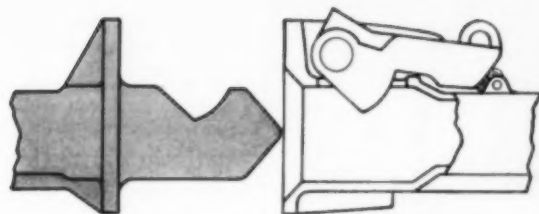
Metal belts—out-of-pocket research cost being paid for by United Electric Coal Cos.—can possibly save \$2,640,000 per year.

Better illumination—out-of-pocket cost by Mine Safety Appliances Co.—could save \$120,000,000 annually at a net of 30c per ton.

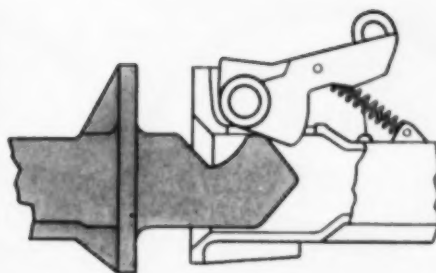
Research has equally good prospects in roof support, ventilation, supply-handling, transportation, power distribution and other mining operations, including washing and drying fine coal.

"I want to make it plain that I recognize the importance of utilization research and sales service—but, important as they are, the benefits that can be derived from them are dependent, to a large extent, on the delivered price of coal compared to that of substitutes. In short the cost of production is the basic item. We have in Bituminous Coal Research, Inc., an agency that has proved its effectiveness, and I feel it is time to give it real funds to do a real job."

GERALD VON STROH, director of development, Mining Development Committee—"What the industry needs is a continuous-mining system rather than merely a continuous-mining machine. . . . To the best of my knowledge there is in existence only one continuous-mining system. In many respects it leaves much to be desired but nevertheless results are amazing. . . . There is no reason to believe that an even-more-efficient system could not be evolved—and one that would be applicable to virtually all mining conditions." The cost would be

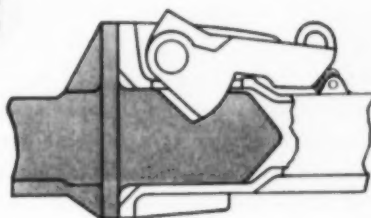


1



2

3



Three line drawings explain locking action of O-B Automatic Mine Car Couplers. Nose of the male coupler head forces cam upward as heads meet; cam snaps back into recess in male head as flanges on mating heads meet.

O-B Couplers Lock Tight on Impact

FOOL-PROOF CAM GIVES POSITIVE INTERLOCK

Just one sturdy cam locks mating O-B Coupler heads tightly and positively. One cam, housed in the female head, drops into the recessed male head, and both are immediately fixed with respect to one another. The cam cannot creep, nor can it be jolted from its seat by hard use. Cars uncouple only when a handler lifts the cam from its seat in the male head.

This is a simple, fool-proof locking mechanism. Few moving parts minimize chances for damage to the lock. Note that the cam tends to drop deeper into the male head recess when pull is ap-

plied. Note also that push on the male head cannot tip the cam upward, for movement between heads is impossible when they are locked together.

Positive interlock between mine cars adds speed and safety to any haulage system. That's one pretty good reason for choosing O-B for your new or re-modeled cars!





With Armco Liner Plates, safety goes up while costs come down. And you can get these double advantages for portals, overcasts, shafts, haulways and other mining structures.

Safety is vital to men and equipment. Used in these underground structures, Armco Liner Plates provide ample strength without bulky weight. The deep, continuous corrugations continue through the lapped joints to eliminate weak spots. Fire-resistance is another safety feature.

Costs take a beating because Armco Liner Plates are so easy to install. From

start to finish, any labor crew can handle the job. In most cases, one man can carry, hold and bolt one of these plates into place, using only a structural wrench. Installation goes fast.

Wide range of Liner Plate gages and structure sizes let you select exactly what you need. Try safe, economical Armco Liner Plates as a solution to your next mine structure problem. Just write for details. Armco Drainage & Metal Products, Inc., 2553 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO LINER PLATES



more than \$4,000,000; the results, a saving of more than \$1 per ton.

The present four projects of the Mining Development Program should contribute to the ultimate development of a continuous-mining system.

Continuous face transportation—development of a portable surge car, with Irwin Car & Foundry Co. providing out-of-pocket expense.

Metal belts—one belt has been in continuous daily service for over 6 mo.

Illumination—Project will first consist of installing in an actual working section the same type and quality of illumination used in shops and factories.

Dust-control—Review of literature and an investigation of what has and is being tried.

"With presently available funds, we should, by Sept. 1, 1953, obtain some worthwhile results."

The Chemical Outlook

E. R. WEIDLEIN, president, Mellon Institute—"We predict that coal conversion into liquid fuels and chemicals will become the main use of coal, with crude coal, like crude oil, accounting for only a small part of the fuel's direct usage. This forecast will become a reality through well-organized scientific research."

Market Opportunities

HOWARD J. ROSE, vice president and director of research, Bituminous Coal Research, Inc.—"What are the possibilities for steady growth and prosperity in the coal industry? The possibilities are excellent if the coal industry will plan, invest and work hard to earn its future prosperity. Many factors are involved but research and development work of one kind and another are essential to improve every step from the mining of coal to its ultimate use."

"Faced by present conditions, some coal men find it hard to imagine an expanding and prosperous coal industry. Yet many of your biggest and best-informed competitors, as well as coal users and economists, agree that coal can have a great future, not at some hazy distant date but beginning as soon as the coal industry supports and starts to cash in on really adequate programs of research, development and marketing. . . .

"What are some of the possibilities for increased markets for bituminous coal? What is BCR doing about them with its present modest funds? And how vulnerable are such markets to capture by competitive fuels?

Electric utilities have been an expanding coal market, even though their percentage of the total market has been decreasing, making it impossible to say that it is completely safe. "What can be done to increase the sale of coal to electric utilities? One possibility is to increase the demand for electricity in those areas where it is made from coal." Examples are: (1) production of steel by the electric furnace, which is now quite competitive with the open hearth, and would mean a possible market of 30,-000,000 tons a year; (2) railroad electrifi-

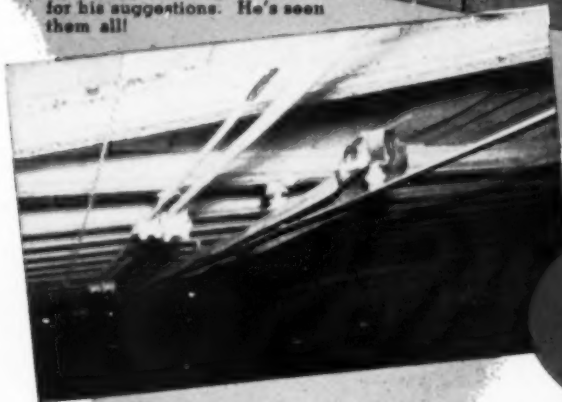
Build Any Overhead with O-B MATERIALS



Outside haulage is well suited to catenary overhead. O-B fittings do the complete job.

Semi-catenary makes a cushioned trolley for smooth current collection. One set of hangers supports both feeder and trolley wire.

O-B Trolley and Feeder Materials combine in any number of conventional overheads. Ask your O-B representative for his suggestions. He's seen them all!

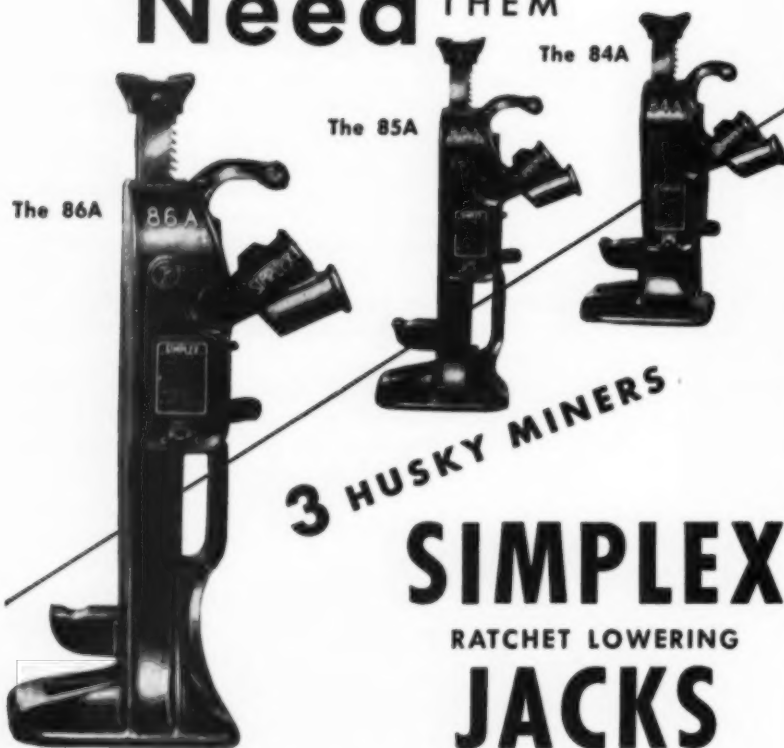


Any sort of overhead system you choose for new or extended haulage service can be built best with O-B Trolley and Feeder Materials. In fact, many of the O-B fittings work equally well in several types of construction. Whether your mining plan calls for catenary, semi-catenary, or one of the conventional trolley and feeder overheads, you'll find O-B standard fittings ready to do the job. Probably the O-B materials you have in stock can be used for any new type of overhead work you are planning.

Check your No. 27 Catalog, and check with your O-B representative before starting on new overhead. Between the two you're sure to find ways to save time and money!



YOU **Know** THEM Use THEM Need THEM



3 HUSKY MINERS

SIMPLEX RATCHET LOWERING JACKS

For Thick Seams:

No. 86A is 20" high and will lift 5 tons 13". Most mines use it for rerailing, moving and adjusting machines, conveyors, etc.

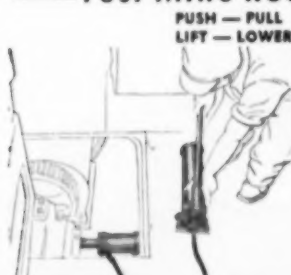
For Medium Seams:

No. 85A is 17" high and lifts 5 tons 10". Otherwise like 86A, but requires less space.

For Thin Seams:

No. 84A is 14" high, lifts 5 tons 7" and weighs only 28 lbs. Has all the famous Simplex safety features.

—Test Mine Roof Bolts and 100 Other Jobs—



RE-MO-TROL—Hydraulic Pump and Remote-controlled Ram—is invaluable wherever heavy work turns up in mines, or force must be exerted from unusual positions. It's a jack. It's a puller. It's a pusher. It's a powerhouse—and it applies hydraulic force safely from a distance. Re-Mo-Trol Units are available in 10 to 100 ton capacity.

Famous Simplex "Center-Hole" Reduces effort 75%. Simplifies rigging.



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Mines 47 and Mines 48
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Jacks

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cation, shown to be about 8% less costly than diesel operation and representing annual consumption of 1,000 tons per mile of electrified track; (3) better use of coal in utility plants; (4) cooperation with utilities and equipment manufacturers to keep coal solid for power generation and thus reduce the hazard of atomic-power competition; (5) development of the coal-fired gas turbine for stationary plants.

Motive-power projects receiving BCR attention include steam-locomotive cinder control and smoke abatement on Great Lakes vessels, with good results in both directions.

Commercial and small industrial projects include reduction of stack dust, the BCR fuel calculator, the automatic steam generator, combustion conferences, well-engineered spreader-stoker plants, and model steam-plant package plans and specifications.

Residential projects include a residential stoker conference now being scheduled, the BCR downflow stoker, and smokeless heaters and furnaces.

Among the several agricultural projects is the BCR crop drier, one of the most-recent and promising developments; also coal-heated chicken-brooder houses and tobacco curing.

In the field of fundamental research, the "BCR budget problem imperils future support of this very-important program."

BCR is now engaged in technical and economic surveys, and in the preparation of a statement of the chemical and process possibilities for coal, that already has shown signs of paying off in a big way. Under gasification in a tabulation of "New Horizons for Coal," "if only 20% of the natural gas now being supplied by public utilities was replaced by high-Btu gas produced from coal, this would create a new market for 70,000,000 tons of coal annually. Or if only 20% of present petroleum demands were supplied by liquid fuels made from coal, this would require about 250,000,000 additional tons of coal per year."

If the coal industry is to acquire these large potential coal markets, "it will have to work hard to earn them. It cannot afford to wait and merely hope that these new markets will arrive. If the coal industry fails to act aggressively, others will capture the most desirable markets and most of the profits, and commercial coal producers will get the leftovers."

"What do you, as members of BCR, wish to do about this? Your research agency cannot possibly accomplish what is needed with its present small income. There has been a moderate net increase in the number of BCR companies during the past year, but research income is based on tonnage shipments, which are down. Accordingly, BCR's 1953 budget for the general research program is the lowest in 7 yr. Combining the recent drop in coal production with the universal effect of inflation, it is found that BCR's present income is now about half what it was 9 yr ago in 1944. We feel sure that the coal industry has not realized this. . . .

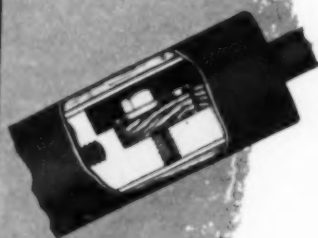
"The coal industry operates on the



H-1 Bottom Terminal.
Set screws hold cable
end in place



H-3 Bottom Terminal.
Bolt tightens against
washer which bears
against looped cable end



O-B Tap Terminals Grip Cable Tight and Stay Tight

Forget about pull-out troubles! Any of these three terminals - with set screws, with a locking cam, or with a hold-down washer - gives high holding strength. Each makes excellent electrical contact with both cable and fuse; thus there is no overheating or oxidation causing a terminal to relax its grip on trailing cable. Terminals that clamp cable tightly - and stay tight after repeated use - prevent pull-out delays, and keep machinery running.

These are the strongest cable-gripping terminals made for use in fused taps. Let them work for you in O-B Form-H and Form-J Fused Taps!



H-2 Bottom Terminal.
Cam swings
down onto bare
cable end and
wedges it securely

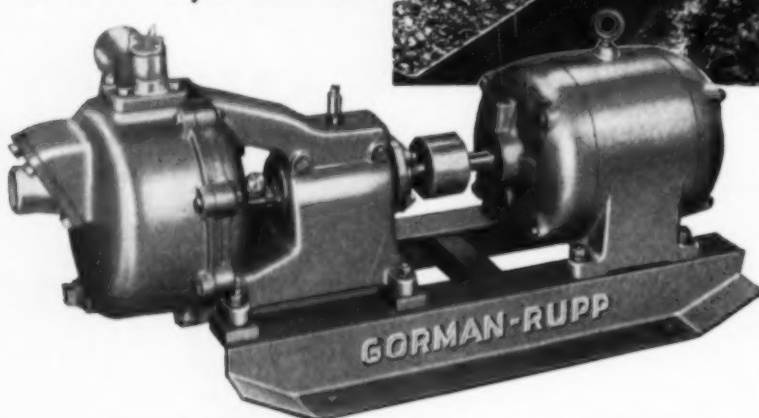


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*Save Money in
Mine Operations*



Gorman-Rupp Mine pumps have long been recognized as the best insurance against pumping troubles and costly shut-downs.

Now, because of the increased efficiency in the latest Gorman-Rupp design, 3 H.P. does what formerly required 5 H.P. or 40% savings in pumping costs, under full load.

These pumps maintain nearly normal capacity under any working head and require very low headroom. Ideal for remote locations, as they require little or no attention.

*Write for bulletin O-ME-11 or contact
your nearest distributor.*

FOR STRIP MINE WATER HANDLING



Gorman-Rupp self-priming centrifugal pumps will handle the toughest jobs. They prime faster, higher, and will pump more dirty water than any other pump of comparable size. Made in all sizes from 1½ inch 5500 G.P.H., to the powerful 10 inch, 240,000 G.P.H.

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world's largest and most-valuable resource of fuel, which is at the same time the world's largest source of organic chemicals. What will the industry do with this enormous treasure? Will it act only from day to day on matters of immediate expediency, and thus merely survive? Or will the industry plan with vision and act with courage to achieve its destiny and by so doing earn prosperity?"

Electricity for Oil By 1975, Lamb Says

Electricity well could become the substitute for a billion barrels of oil by 1975, said George A. Lamb, manager of business surveys, Pittsburgh Consolidation Coal Co., speaking before the Electric League of Western Pennsylvania at a luncheon meeting in Pittsburgh March 9. Mr. Lamb predicted a phenomenal increase in the use of electric power as soon as there is a decline in the supply of oil and natural gas.

The extra shift to electricity, he said, may begin about 1960, or shortly thereafter, which is when many experts believe the United States will have passed its peak production in petroleum. The peak and decline in natural gas should follow petroleum by a few years. Mr. Lamb's views are developed from earlier studies which indicated that the nation's total energy demand will double within 25 yr. This basic energy projection has been confirmed by the President's Materials Policy Commission.

The coal economist points to the disparity between the distribution of the demand and the long-range supply of the respective mineral fuels as the key to an accentuated emphasis on electric energy. If supplies were unlimited, petroleum demand could soar to 7 billion barrels annually within 25 yr. But it will be impossible to obtain from domestic production plus imports, even half of this amount.

Adjusting supply to demand will mean: (1) The cutback of many present oil uses to coal; (2) the use of shale oil and coal-based synthetics; (3) the use of new developments, such as the coal gas turbine; and (4) a tremendous increase in the use of electric power, most of which will have to be based on coal as the source fuel.

Electrical home heating and air conditioning, now in the preliminary stages, will be regarded as necessities under many circumstances by 1975. The whole world of electrical equipment—appliances for the home, machines for the factory, devices for the farm—will be affected by the new needs. So will the worlds of coal production and fuel processing. The members of these fields, as well as industry and business in general, must be alert to the emergence of these needs, for they spell out opportunity of original scope.

However, Mr. Lamb pointed out, for these developments to mature satisfactorily, industry must develop the instruments of power production and utilization to assure relatively low costs to the consumer.

Eliminate 70% to 90% of Conveyor Downtime



Cedarapids

Built by
IOWA

MOTORIZED HEAD PULLEYS

eliminate maintenance on
chains, belts, sprockets, Universal
drives, countershafts, etc.

EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock Motorized Head Pulley is simply a new application of the long-proven gear reduction drive, with everything... electric motor, reduction gears and all moving parts... contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about

the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to motorized efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

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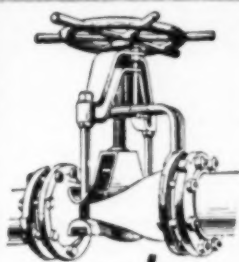
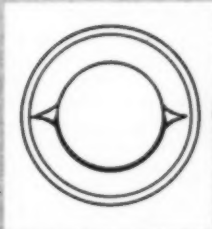
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The Bituminous slogan, "Security with Service," applies to all phases of mining operation... to operators and workers alike. It keynotes the Bituminous Safety Engineering program, consisting of regular mine inspections... analysis of mine hazards... survey recommendations... accident prevention activities... reduction of operating expenses resulting from accidents... and establishment of production efficiency. Bituminous Safety Engineers are constantly alert to the hazards that might affect Bituminous Workmen's Compensation policyholders... and to forestall these hazards before they take shape. Thanks to their training and skill, Bituminous' slogan is a "living" phrase, packed with meaning for the mining industry.

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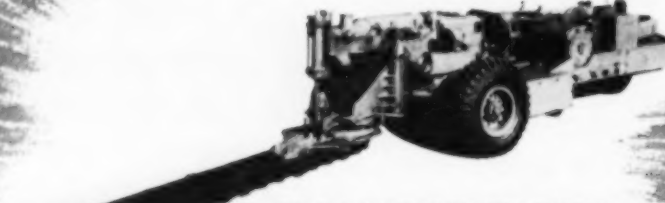


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Write today for complete facts on converting
your track mounted equipment.

Petroleum Council Hits Synthetic Fuel Costs

The National Petroleum Council Feb. 26 completed a \$500,000 study in which it concluded that Bureau of Mines proposals for the manufacture of synthetic gasoline from coal and oil shale are "definitely uneconomical under present conditions" and that "the need for a synthetic liquid fuel industry in this country is still in the distant future." In its summary of the study, the NPC also cast doubt on the value of the Bureau of Mines' multimillion dollar demonstration plants and questioned "the wisdom of government financing" of the huge experimental units.

It pointed out that when the need arises in the U. S. for synthetic gasoline, entirely new techniques, now unknown, may be available. "Such techniques," the NPC said, "can be developed from well-designed pilot plants at a fraction of the cost of the big, expensive demonstration plants." Since 1944 over \$74,000,000 has been appropriated for the Bureau of Mines Office of Synthetic Liquid Fuels for its development program.

The NPC undertook its 2½-yr investigation of the Bureau's design and cost data at the request of the Secretary of the Interior. W. S. S. Rodgers, chairman of The Texas Co., headed the NPC Committee on Synthetic Liquid Fuels Production Costs which was responsible for carrying out the Government request. For some months, while its final report was in preparation, the NPC has been sharply critical of the Bureau's estimates of the cost of producing synthetic liquid fuels as unrealistically low.

As reported by Mr. Rodgers, the committee's estimates of the wholesale costs per gallon at the refining point of gasoline made by various methods were: from oil shale, 14.7c; from coal by the Bureau's Fischer-Tropsch process, 29.4c; and from the proposed hydrogenation process, 36.3c. The current wholesale price of gasoline refined from crude petroleum is about 12c a gallon at the refinery or terminal.

In its report, the committee further concluded that "there is some likelihood of further reducing the cost of manufacturing liquid synthetic fuels by continued research in oil shale and Fischer-Tropsch processing of coal," Mr. Rodgers said. "Coal hydrogenation, on the other hand," he continued, "requires drastic improvement in existing methods to permit economic operation. Such developments are not seen at the present time."

Association Activities

Central Pennsylvania Open-Pit Group Re-Elects Officers

The Central Pennsylvania Open-Pit Mining Association, at its annual meeting held last month in the Dimeling Hotel, Clearfield, re-elected its officers, as follows: president, J. H. Wallin, Philipsburg; vice president, B. M. DuBois, Clearfield; secretary, R. S. Walker, Bigler; treasurer, Herman S. Moore, Philipsburg.



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AT LESS COST**



Built for tough off-the-highway hauling, Rear-Dump and Bottom-Dump "Eucs" have stepped up production and cut hauling costs on hundreds of open pit mining and quarry operations.

Euclids have proved their efficiency and long life in hauling a wide variety of materials... coal, ore, rock, overburden and other heavy excavation. Bottom-Dumps are powered by diesel engines of 190 to 300 h.p. ... loaded speeds up to 34.4 m.p.h. ... available in 20 to 40-ton capacities. Rear-Dump "Eucs" have travel speeds up to 36.3 m.p.h. ... powered by diesel engines of 125 to 400 h.p. ... range in capacity from 10 to 34 tons.

Your Euclid Distributor has performance data on jobs similar to yours. Ask him for a Euclid hauling cost estimate — there's no cost or obligation.

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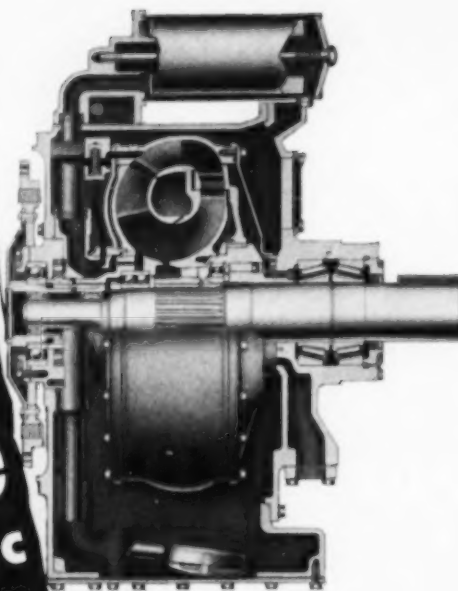


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NEW TWIN DISC

TWO- Stage HYDRAULIC

TORQUE CONVERTER



Filling the gap in industrial hydraulic drives, Twin Disc offers the first of a new series of Two-Stage Hydraulic Torque Converters — providing maximum operational efficiency, up to 4:1 torque multiplication at stall combined with progressively increasing engine speed during acceleration or uniform pull-down under load. This new series features complete unloading of the engine at high-speed, no-load conditions, providing economy and minimum cooling requirements.

This new concept in Two-Stage Converters—developed in close cooperation with leading engine and equipment manufacturers—is backed by the

same engineering and service reputation that has already made Twin Disc the acknowledged world leader in the development of Industrial Three-Stage Hydraulic Torque Converters.

If you are using powered equipment needing a Torque Converter Drive — and for which the modified performance characteristics indicated are desirable—write for specific information on the new Two-Stage Torque Converter Series. Address all inquiries to Twin Disc Hydraulic Division, Rockford, Illinois.

Typical Twin Disc Two-Stage Hydraulic Torque Converter, Model SD (shown above), with Spider Drive and Disconnecting feature.

Built for a Long Life...
Backed for
a Lifetime



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and executive secretary, G. Albert Stewart, Philipsburg. Clair Hall, of Snowshoe, and John T. Minns, of DuBois, were named as new members of the board of directors.

Big Sandy-Elkhorn Institute Elects M. E. Prunty

Big Sandy-Elkhorn Coal Mining Institute, at a dinner meeting featuring the annual ladies' night, Feb. 28, in Wheelwright, Ky., elected M. E. Prunty, safety director, Consolidation Coal Co. (Ky.), president, succeeding A. M. Ayers, general manager, Russell Fork Coal Co. Other officers and directors named were: first vice president, Harry McCarty; second vice president, James Fleming; third vice president, I. C. Spotte; and secretary-treasurer, J. H. Mosgrove. Directors: J. T. Parker, M. K. Reed, J. E. Green, Edgar Dale, V. A. Hensley, Arthur Bradbury, B. F. Gish, Seth Kegan, A. M. Ayers, George E. Evans Jr., John L. Coyer, Cecil Sherman, M. M. McCormick, C. H. Brown, William Stapleton, and Ward L. Reed. W. A. Pack, foreman, Inland Steel Co., was presented with a mine-safety lamp in recognition of eight consecutive years of no lost-time supervision.

Illinois Operators Hold 23rd Annual Meeting

At the 23rd annual meeting of the Illinois Coal Operators' Association, held in Chicago March 11, the association's Executive Board elected the following officers: H. A. Treadwell, president; C. W. Peterson, treasurer; Fred S. Wilkey, secretary; and Thurlow G. Essington, general counsel. Members of the executive board named at the meeting included Stuart Colton, George B. Harrington, F. F. Kolbe, George C. McFadden, T. C. Mullins, Stuyvesant Peabody Jr., A. H. Truax and William P. Young.

Pa. Safety Group Elects

L. D. Kimmel, Indiana, Pa., Pennsylvania mine inspector for the 30th Bituminous District, has been elected president of the North Central District Safety Association. He succeeded James Blackburn, of Kittanning, inspector for the 2d Bituminous District, who was named second vice president.

National First-Aid Contest To Be Held In Ft. Wayne, Ind.

The 1953 National First Aid and Mine Rescue Contest, sponsored by the USBM, will be held Sept. 29-Oct. 1 in Ft. Wayne, Ind., it was recently announced. The actual competitions will be held in the Allan County Memorial Coliseum, with headquarters in the Hotel Van Orman. The mine-rescue contest will be staged on the first day, the first-aid competitions on the second and third days, and awarding of prizes at a banquet on the evening of the last day. Top teams from the various mining regions will participate and organizations co-operating in the meet include the National Coal Association, UMWA, local operators' associations and individual coal companies.

There's
"bargain tonnage"
 under that overburden



CARDOX *Surface* **AUGER MINER**

CARDOX Surface AugerMiners burrow under excessive overburden... drill back 100 to 120 feet, to salvage deeply buried coal at a small fraction of the cost to the original working by conventional methods. *This is high-profit production in its most economical form!*

The rugged, powerful Auger-Miner is trucked or towed on its detachable wheels to the face and positions itself to the height of the seam. Driven by a 145 H.P. engine, augers up to 36 inches in diameter drill out the coal

ready for mechanical loading into trucks. The coal you get is clean and free of rock or shale because directional control keeps the auger boring into the best part of the seam. A built-in retriever easily adds or removes the six-foot auger sections.

If you have a property where overburden has choked off profitable stripping, the CARDOX Surface AugerMiner may open the way to the most profitable coal you've ever mined! See your CARDOX Representative—or write for AugerMiner bulletin

drills!

**NEW PROFITS
 out of "DEAD"
 STRIP MINES**



CARDOX Underground AugerMiner

For mines where thin seams or poor roof conditions make conventional mining unprofitable or unsafe, the CARDOX Underground AugerMiner can renew economical production. Write for bulletin.

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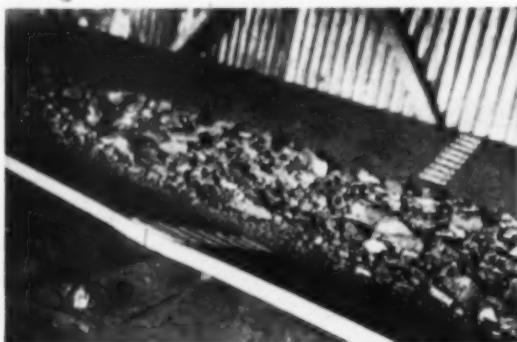
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 Box 427
 Phone: Liberty, Colonial 3-6910
 Camden-on-Gauley, W. Va.
 Phone: Camden-on-Gauley 2181

Louisville, Colorado
 Phone: Louisville 234
 Ottumwa, Iowa
 Phone: Ottumwa 51

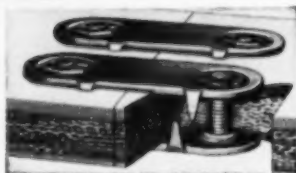
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- ★ Trough naturally, operate smoothly through take-up pulleys.
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- ★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

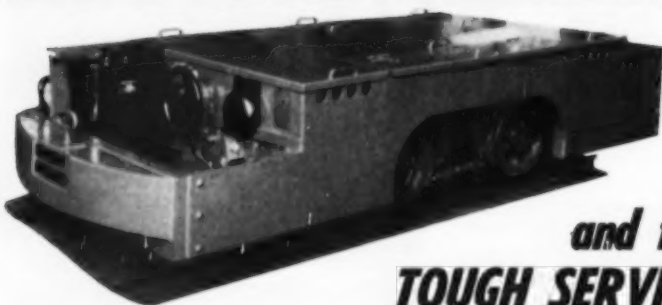


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Type F Built as low as 28"

and for **TOUGH SERVICE**

Atlas Type F Storage Battery Locomotives are built with 2 motors like trolley locomotives. One motor drives each axle through Atlas' dependable spur gear drive. Built low to go anywhere your mine cars can travel.

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THE ATLAS CAR & MFG. CO.

ENGINEERS

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1140 IVANHOE RD.

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NEW MINES . . . From p 134

B&O. Coal is presently being trucked to the loading point pending erection of a tippie, which is expected to be served by a 3,000-ft spur to be constructed. Also in the same area, the Rex Eagle Coal Co., Inc., Summersville, is developing a new mine in the Eagle seam to a capacity of 500 tpd, shipping via the B&O from Muddlety, Nicholas County. F. P. Smith, associated with the Inland Collieries, Inc., is president of the company and Dexter-Carpenter is exclusive sales agent. Mr. Rees also is president and general manager of the Universal Coal & Coke Corp., Summersville, which recently opened the Vaughan drift mine in the Eagle seam. The property will have a capacity of 600 tpd and ship via the C&O. The Capitol Fuel Co. is sales agent.

High Operating Costs Close Mines in Various Areas

High operating costs, coupled in some cases with slack markets or virtual working-out of the properties, were cited in the closing of a number of mines reported in recent weeks.

In West Virginia, Eastern Gas & Fuel Associates closed down its 2,000-tpd Carswell mine as of February because of "economic conditions" resulting from slack markets. The operation mines the Pocahontas No. 3 seam and employed 468 men. At the same time the Island Creek Coal Co. reported the permanent closing of its Nos. 1 and 30 mines at Holden. According to reports, No. 30 was almost worked out and it was not economical to mine the remaining coal. Acreage formerly mined at No. 1, the company's first property, is to be combined with Mine No. 7 and will eventually be mined through that opening. Some 338 men were affected by the closings, but most of them were expected to be absorbed by other company operations. The company also announced that it would add a night shift at its No. 24 mine in Mingo County April 1, increasing output there from 2,300 to 3,800 tpd.

In Pennsylvania, the Pennsylvania Coal & Coke Co., closed its No. 10 mine at Gallitzin because of rising operating costs. The property employed 112 men and produced about 725 tpd. Depleted reserves and unprofitable mining of the remaining coal were given as the reasons for closing the 40-yr-old Underwood colliery of the Pennsylvania Coal Co., at Olyphant, employing 300 men. The breaker will continue to operate. In central Pennsylvania, the Hastings Nos. 1 and 2 mines of the Rich Hill Coal Mining Corp. and the Lilly 3-A mine of the C. A. Hughes & Co., Cresson, shut down because of high operating costs and reduced market demand, affecting a total of 144 men.

North Carolina's only commercial mine, the Carolina mine of the Raleigh Mining Co., Sanford, a subsidiary of Walter Bledsoe & Co., is reportedly being shut down permanently because of a fault in the coal seam. The property was closed temporarily a year ago when workings



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Why not try the Cities Service one-source plan? You'll find it saves time in buying, cuts equipment down-time, and adds dollars to your profit column. Call your nearest Cities Service office or write Cities Service Oil Company, Dept. D5, Sixty Wall Tower, New York City 5, New York.



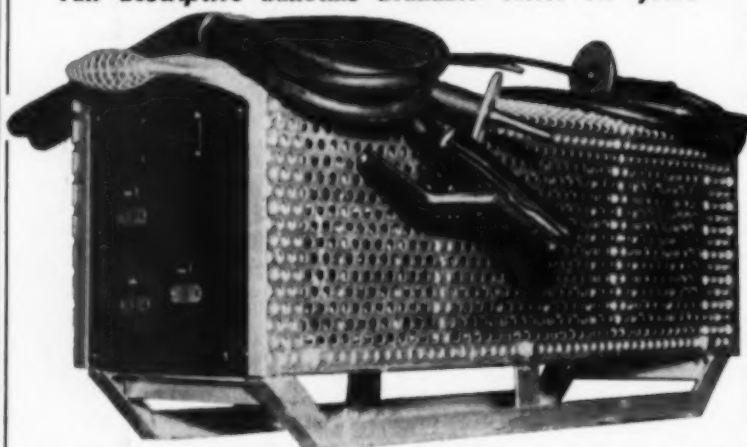
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Is easy to drag around even in low coal. Thin design permits easy removal from cars. A sturdy dependable unit that can be quickly and easily hauled to the job and put to work immediately.

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ran into a faulted area and a 300-ft tunnel and test drillings in the area failed to relocate the seam. Pumps and other salvageable machinery are being removed from the property.

In Virginia, the Clinchfield Coal Corp. announced March 11 that it was closing its No. 3 mine at Dante, one of its oldest operations. Opened in 1909, the mine was currently employing 175 men, with an output of 1,000 tpd. According to reports, the remaining coal reserves were insufficient to warrant investment in mechanical mining equipment and modern preparation facilities necessary for profitable operation under present market conditions.

Preparation Facilities

C. M. Bixler, Valley View, Pa.—Contract closed with Wilmot Engineering Co. for one Type A Wilmot Simplex Jig to prepare stove and nut coal; feed capacity, 15 tph.

Atkins Coal Co., Frackville, Pa.—Contract closed with Wilmot Engineering Co. for two 2½-ft-diameter Wilmot Hydrotators, preparing Buckwheat No. 1 and rice coal; total capacity, 36 tph.

Stonega Coke & Coal Co., Appalachia, Va.—Contract closed with Wilmot Engineering Co. for one Wilmot-Daniels heavy-density system with one 200-A Roller (HM) coal cleaner for preparing plus ¼-in at feed rate of 170 tph.

Clearfield Bituminous Coal Corp., Indiana, Pa.—Contract closed with Wilmot Engineering Co. for one 200-A Roller coal cleaner for preparing bituminous coal at feed rate of 150 tph.

Gilberton Coal Co., Gilberton, Pa.—Contract closed with Wilmot Engineering Co. for one Wilmot-Daniels heavy density system with one 400-C Roller (HM) coal cleaner for preparing pea, buck and rice anthracite; feed rate, 225 tph.

Kentucky Fuel Co., Hellier, Pike County, Ky.—Contract closed with Hawthorn Engineering & Mfg. Co. for table-plant installation including three Deister Diagonal-Deck concentrating tables to clean ¾x0 coal, supplementing recently completed heavy-density plant preparing 5x½; ¾x0 to be tabled, currently being disposed of as low-grade steam coal, will be remixed with 5x½ cleaned sizes for metallurgical use; capacity of table plant is 25 tph of raw feed, with 20% reject.

Harmar Coal Co., Harmarville, Pa.—Shipment by the Deister Concentrator Co. of 24 SuperDuty Diagonal-Deck No. 7 coal-washing tables.

Pennsylvania Water & Power Co., Safe Harbor, Pa.—Shipment by the Deister Concentrator Co. of one Model 108-B Concenco revolving feed distributor.

U. S. Steel Corp., Robena slope mine, Poland, Greene County, Pa.—Shipment by Deister Concentrator Co. of three Model 109 Concenco revolving feed distributors.

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and Types of Attachments



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PITTSBURGH 16, PA. -- Harold C. Lusk, 3045 West Liberty Avenue

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NEWS BRIEFS AND TRENDS . . . From p 133

can be legally used, the law must be changed the court maintained, stating that the "only relief lies with the legislature of this state." The case was originally started more than a year ago by the National Mine Service Co., manufacturer of the locomotive, and the Pond Creek Pocahontas Co., purchaser of the first unit made, in an effort to reverse a ruling of the state Department of Mines prohibiting its operation underground. Although, as the companies pointed out in their suit, the U. S. Bureau of Mines has approved the diesel locomotive as "completely safe and not harmful to the health of any miner," the UMWA has continued to strongly oppose its introduction in coal mines.

1952 Coal Company Earnings

Island Creek Coal Co.—1952 net profit (final) of \$2,992,169, or \$2.39 a common share after preferred dividends; 1951, net of \$5,705,369, or \$4.67 a common share.

Lehigh Valley Coal Corp. and Subsidiaries—1952, net loss of \$1,008,315 on sales of \$26,237,841; 1951, net profit of \$347,834, or \$1.56 a preferred share, on sales of \$33,244,408.

Old Ben Coal Corp.—1952 net of \$738,756, equal to 84c a common share, on net sales of \$33,356,203; 1951 net of \$1,681,815, or \$1.92 a share, on sales of \$37,112,438.

Pennsylvania Coal & Coke Corp.—1952 net of \$334,393, or \$2.00 each on 166,751 common shares; 1951 net of \$4,821, or 3c each on 148,139 shares.

Pittsburgh Consolidation Coal Co.—1952 net of \$14,866,395, or \$6.86 a share; 1951 net of \$16,039,319, or \$7.44 a share.

West Kentucky Coal Co.—1952 net of \$2,594,129, or \$2.92 a share; 1951 net of \$2,916,814, or \$3.40 a share; 1952 revenues from sales of coal, royalties and other sources totaled \$22,588,501; output from company properties, 5,738,617 tons. In 1951, revenues were \$23,121,715 and output 5,513,890 tons.

W. Va. Senate Blocks Coal Tax

The West Virginia Senate Finance Committee, at a night meeting March 2, killed, at least for the time being, a measure calling for a severance tax on natural resources as proposed by Gov. Marland. The committee voted against a motion to remove the bill from the table and to reconsider its previous action, and under the senate's rules the same bill may not be again considered, it was reported. Earlier, Gov. Marland's proposal for a tax of 10c a ton on coal mined in the state and taxes on oil and other exploited resources had been supported by John L. Lewis, UMWA head, after a conference with the governor (March Coal Age, p 136).

Pennsylvania Bill Prohibits Gas Storage Under Coal Mines

A bill to prohibit underground storage of gas beneath operating coal mines, or within 4,000 ft of a mine, was introduced in the Pennsylvania Legislature March 9 by Robert Kent, House Republican whip from Crawford County. The bill is an essential safety measure for the protection of life and property and will protect coal miners against the new and man-made dangers introduced by the underground storage of gas, Mr. Kent said. Under the terms of the bill, storage operators will have to publicly file information on existing and proposed storage pools, location of wells, etc., but the bill does not apply to strip or crop mines, mines with overburden of not over 60 ft or employing less than five people. The proposed law has strong support as a necessary safety step from both the anthracite and bituminous industries, various operator associations and the state Department of Mines. Pointing out that the state has no such law now, William J. Clements, Pennsylvania Secretary of Mines, said that the bill has the backing Gov. Fine's administration and "is something we've needed for a long time."

Capital-Spending Survey Shows Strong Years Ahead for Coal

Coal hydrogenation may reach the stage between now and 1956 where it will require large capital expenditures. That's one of the revelations contained in the sixth annual McGraw-Hill survey of business plans and expectations, released to the press April 3. The report is based on statements of plans by industrial companies employing more than 60% of all workers in industries where capital investment is highest.

Other highlights of the McGraw-Hill survey of planned capital expenditures, measuring the projected growth of American industry and thus affecting coal directly and indirectly, are as follows:

1. Coal companies foresee a need for more continuous mining machines.
2. Sales of petroleum and coal products

are expected to grow 14% by 1956.

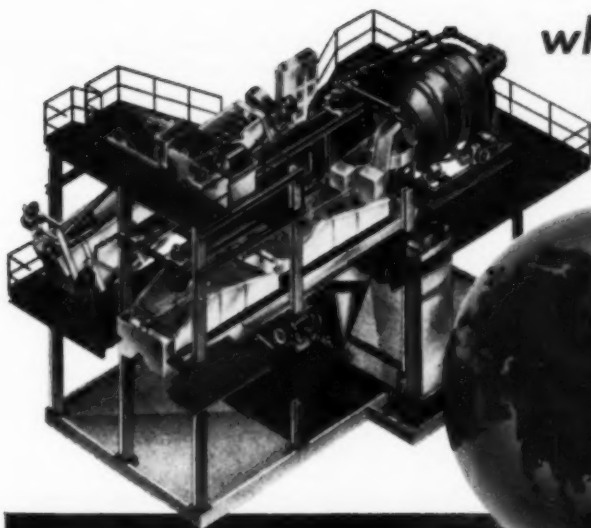
3. Sales of electrical machinery are expected to increase 22% by 1956.

4. Electric and gas utilities expect to spend \$5,883,000,000 for capital improvements in 1953; \$5,572,000,000 in 1954; \$5,467,000,000 in 1955; and \$5,647,000,000 in 1956.

6. Petroleum and coal-products companies expect to spend \$2,908,000,000 for capital improvements in 1953; \$2,792,000,000 in 1954; \$2,588,000,000 in 1955; and \$2,530,000,000 in 1956.

7. Capital spending in 1953 will be 6% higher than in 1952, with most of the spending being done by utilities, mining and airlines.

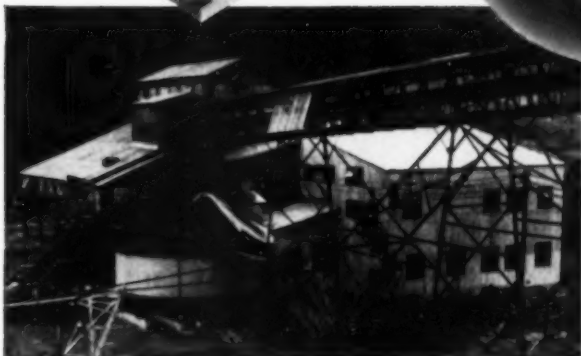
8. Manufacturing capacity will increase 16% by 1956; sales, 10%.



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Approximately 185 Heavy Media plants have been placed in operation or are under construction throughout the world. Of these, 100 are Wemco Mobil-Mills located in 18 states and 15 foreign countries, and having an aggregate rated capacity of **50 million** tons annually. Here is remarkable proof of Wemco's design know-how and extensive experience in the Heavy Media Separation field.

Anthracite and bituminous coal rank first in tonnage among materials now being economically produced by Mobil-Mills. Wemco Mobil-Mills provide accurate control over coal washing with the necessary flexibility for efficient cleaning of a wide range of sizes and grades. More and more coal operators are using Mobil-Mill cleaning to assure a high yield of clean coal—the kind that always finds a steady demand. You, too, will find it profitable to learn more about the Wemco Mobil-Mill.

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Mobil-Mills are furnished in five basic sizes and several models with smaller or larger plants varying in capacity from 25 to 420 TPH. Each plant is equipped with a choice of one of the following type separators:

- 1 **WEMCO SINGLE DRUM** for accurately controlled washing of a full range of sizes from 8" to 1/4".
- 2 **WEMCO TWO COMPARTMENT DRUM** for efficient cleaning of coal having middling content requiring two-gravity, three product separation.
- 3 **WEMCO CONE SEPARATOR** for economical, large volume production of fine coal up to 4" in size.

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Always a leader in its field, Sprague and Henwood, Inc. has been working for a number of years on the development of new types of Diamond Bits, to supplement their well-known "TRUCAST" bits, which are still unsurpassed for many diamond drilling requirements.

NOW, after having been thoroughly proved by Sprague and Henwood's contract drilling crews, under every variety of drilling conditions, these new bits are available to other users. Two new types of "Powdered Metal" matrices; improved "Cast Metal" matrices; "Impregnated" coring bits; a new faster-cutting "Taper" bit for drilling blast holes in very hard rock—are all illustrated, described and tabulated in a new 16-page bulletin, No. 320. Write for it today if you can use it to advantage.

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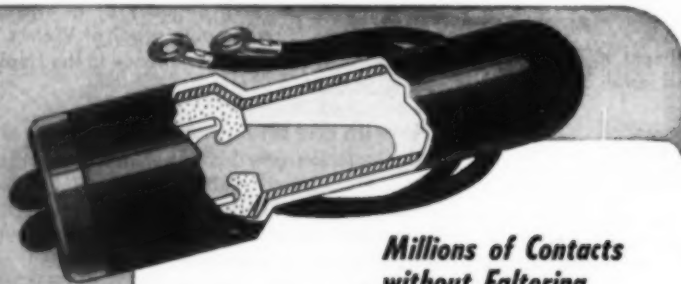
in depth. Other modern machines provide for very deep core-drilling and for either core-drilling or blast-hole drilling underground. We also manufacture a complete line of improved accessory equipment. Illustrated bulletins containing detailed information mailed promptly.

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We do drilling by contract and are one of the oldest and largest contractors for any type of core drilling. Experienced crews are available at all times for service anywhere in the world. Estimates submitted promptly on request.

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Coal Leader and Magazine Cop Freedoms Foundation Awards

Stanley B. Johnson, president, Lorain Coal & Dock Co., Columbus, Ohio, and the company's employee magazine, *The Lorain-Lorain Journal* have won awards from Freedoms Foundation, Valley Forge, Pa., for outstanding contributions to a better understanding of the American way of life during 1952. Mr. Johnson took second place in the nation-wide competition for his editorial entitled "The Strength of Our American Way," published in March, 1952, in *The Lorain-Lorain Journal*. His editorial pointed to recognition of the dignity and worth of the individual man as the source of America's moral strength and to free competitive enterprise as the source of the Nation's economic and industrial strength. This is the second time Freedoms Foundation has tapped Mr. Johnson for honors. The first award came in recognition of an article entitled "Faith of Our Fathers," which appeared in 1950. *The Lorain-Lorain Journal* award was a Certificate of Merit in the employee-publication classification.

West Virginia Measure To Regulate Auger Mining

The West Virginia Senate March 10 passed and sent to the House a bill making auger mining in the state subject to the same regulations as strip mining. Before passage, the bill was amended on the floor to set the auger-operator's bond for land restoration at \$500 a mile instead of \$500 an acre as required of strip mine operators.

Fund Rules Changed Again

Pension eligibility requirements of the Bituminous Welfare & Retirement Fund changed earlier this year (March *Coal Age*, p 135) have been relaxed somewhat, it was reported last month. Under the new rule, a miner must have worked in the industry for 20 yr within the past 30 yr to be eligible for a pension. The earlier revision required 20 yr of work within a 25-yr period.

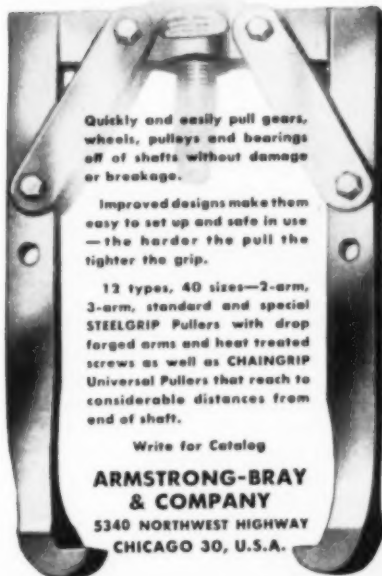
BCI Coal Film Honored

Another mark of recognition has been given Bituminous Coal Institute's movie on coal mining, "Powering America's Progress," with the award by the Freedoms Foundation of a George Washington Honor Medal, one of the Foundation's annual awards for noteworthy contributions to a better understanding of the American way of life. Last year "Powering America's Progress" received a certificate from the Film Council of Greater Boston for winning first place in the public relations section of its annual film festival.

Peabody Coal Marks 70th Year

The Peabody Coal Co., Chicago, is currently celebrating its 70th anniversary. Since 1883, when Francis S. Peabody, grandfather of the present company president, started the company, it has operated directly or through subsidiaries 69 mines in nine states and in Canada and has mined 416,225,262 tons of coal

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Inland Steel Slashes Costs with Koppers PRESSURE-CREOSOTED TIES



KOPPERS PRESSURE-CREOSOTED MINE TIES in service at Inland Steel's coal mine at Price, Kentucky. Inset shows entrance to mine.



DURING the past several years, Inland Steel Company has installed Koppers Pressure-Creosoted Ties and Lumber in this coal mine at Price, Kentucky. By using pressure-creosoted ties, Inland Steel minimized tie replacements and *guaranteed* fewer interruptions in their operations.

Annual tie costs were slashed, too. Had other than pressure-creosoted ties been used, yearly maintenance

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Neff & Fry Silo a Coal Reservoir

The 30' x 40' Neff & Fry Silo, at the Burton Mine of Richwood-Sewell Coal Co., has a storage capacity of 707 tons. Coal from the mine mouth enters the top of the silo, then is drawn out the bottom for the grading and preparation machines. Plate feeder conveyors are used. The silo serves as a reservoir to take care of fluctuations between production and processing.

This installation is typical of many we have made at coal mines, although the details of moving the coal are especially worked out between the conveyor manufacturers and ourselves to meet each particular situation.

If you're interested, we'll be glad to send you preliminary information looking toward a survey of your requirements.

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SUPER-CONCRETE STAVE STORAGE BINS



Mingo County Officers Incorrectly Noted

WE'RE SORRY for the slip-up that resulted in our incorrectly identifying the newly elected officers of the Mingo County Mining Institute in this photo appearing on p 158 of March *Coal Age*. In order above they are: vice president of the institute, T. C. Hamill (left), assistant general manager, Sycamore Coal Co.; president, A. E. McClellan (center), general mine foreman, Howard Colliery, Norfolk & Western Ry. Mining Dept.; and secretary-treasurer, John Zsoldos (right), safety inspector, Howard Colliery.

And For Your Information . . .

A record of 159 consecutive accident-free days was set up to Feb. 23 by the Nellis mine of the Armco Steel Corp., C. O. Kane, manager of Armco's Mining Div., has announced. The new mark, which was still continuing in mid-March according to last reports, beat the previous record of 188 days established in 1930. Up to Feb. 23, the 270 mine employees had worked 210,000 man-hr and produced some 160,000 tons of coal.

An investigation of reported violations of civil liberties stemming from the UMWA organizing campaign in Clay and Leslie Counties, Kentucky, was begun March 18 by a federal grand jury in Lexington, Ky. Some 162 witnesses were scheduled to appear before the grand jury in an attempt to determine the facts behind the many reports of violence in the area.

The Union Pacific R. R. would convert "a great many" of its oil-burning locomotives back to coal "if we were assured of a reasonably certain supply of coal," P. J. Lynch, the railroad's vice president of operations, recently told some 2,000 miners of the Union Pacific Coal Co. at the company's semi-annual safety meeting. In guaranteeing the miners the terms of any nationwide settlement if they will continue to supply the railroad with coal during any national work stoppage, Mr. Lynch said "we are not giving up coal and the day when we do is too far away for us to consider tonight."

A suggestion that coal producers should stand the cost of federal mine inspection was made by Rep. Budge (R., Idaho) at a hearing of the Interior Appropriations Committee in February. Packing plants are required to pay for their inspections, so why shouldn't coal mines, Rep. Budge pointed out. The matter was raised as J. J. Forbes, director of the Bureau of Mines, was appearing before the com-



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is another job this versatile unit does well. The simple rugged design of the Ware loader correctly distributes weight on tractor frame, regardless of the operation being performed. Down-pressure can be applied when it is necessary in tough digging. Hydraulic rams absorb shock loads... mean longer life and lower maintenance for both tractor and loader.

HYDRAULICALLY CONTROLLED BUCKET assures greater "breaking-out" action—full bucket loads every time. 28" roll back helps prevent wasteful spillage.

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Take a look at the "profit pictures" shown here. They'll convince you that it's well worthwhile to ask your Oliver Industrial Distributor to arrange a demonstration of an Oliver tractor-loader combination for you.



DISCHARGE IS FAST OR SLOW, depending on how you want it. Hydraulic controls make this possible. Mid-section pivot of loader arms give longer reach in dumping position.



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A complete line of industrial wheel



and crawler tractors



mittee to seek an additional \$475,000 for the fiscal year ending June 30, to handle additional inspections and safety enforcement.

Three men were killed March 6 while working in a concrete-lined shaft of the Jamison Coal & Coke Co.'s new Mine No. 22, near Fairview, W. Va. The men, who were working about 50 ft from the top of the almost completed shaft, were blown to the surface by the explosion. According to reports, the shaft was ventilated and no electrical equipment was being used. Cause of the blast could not be immediately determined.

A measure requiring land owners "to fill every trench, hole, cut or pit" re-

sulting from strip mining has been introduced into the Pennsylvania legislature by five representatives from Luzerne and Lackawanna counties. If not done by the owner, the state Department of Mines could fill the areas within 60 days of the bill's passage and the owner would be liable for the costs.

A group of power companies in Wyoming are making studies of possible sites for erection of a steam-generated power plant to spur the state's industrial development. A preliminary engineering survey recently completed is reported to eliminate nine of the 15 sites originally considered for the plant.

A temporary injunction against the

UMWA forbidding interference with operations of the Robert Bailey Coal Co. has been issued by Judge Ball of the Clearfield County (Pa.) court. The order was effective until a hearing on a permanent injunction scheduled for March 25.

New Books for Coal Men

Analyses of Coal

For Government Purchases

Analyses of Tipple and Delivered Samples of Coal (Collected During the Fiscal Years 1948 to 1950 inclusive), by N. H. Snyder and S. J. Aresco. USBM, Bulletin 516. These analyses, covering samples of coal from mines in 22 states and Alaska, have been used by the federal government in buying coal and are kept in open file for industrial and public purchasing agents. 55c, Supt. of Documents, Government Printing Office, Washington 25, D. C.

Analyses of Tipple and Delivered Samples of Coal (Collected During the Fiscal Year 1951), by S. J. Aresco and C. P. Haller. USBM, R. I. 4934. This publication up-dates the volume above. 93 pp. 8x10½-in.; paper; mimeo. Free. Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.

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2 HYDRAULIC FLUID MOTOR DRIVE
Hose Coupled to Remote Power Unit

3 HYDRAULIC CYLINDER TYPE
Hose Coupled to Remote Power Unit



These three Nolan models will help you meet every requirement and condition in spotting cars for loading . . .

and may save you as high as
40 minutes per shift!



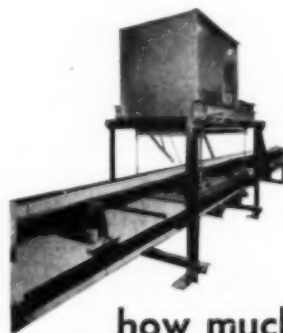
The Nolan Porta-Feeder has been in successful use in many mines for over two years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

The Porta-Feeder mounts between the rails on top of the track ties, and is secured by jacks. Little or no excavation or preliminary foundation work is necessary. The construction is strong and massive. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion. We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.



THE NOLAN COMPANY

106 PENNSYLVANIA ST.
BOWERSTON, OHIO



how much
has the conveyor
carried to NOW?

The MERRICK WEIGHTOMETER gives the answer. While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER not only keeps a continuous and accurate record of weights but total weight is available at a glance. Applied to any size belt conveyor, either horizontal or inclined. The Weightometer gives a simplified and dependable record of your production, without interrupting flow of coal.

Write for Bulletin 851

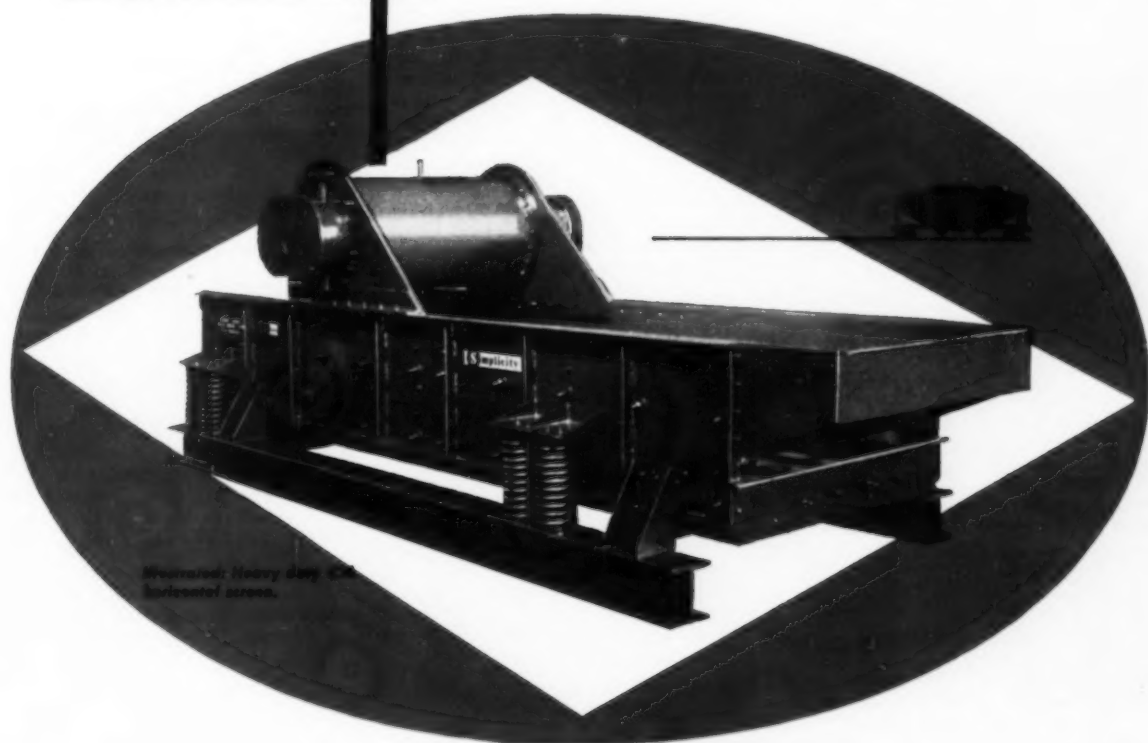
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Engineers and Mfrs. of Automatic
Weighing Equipment
PASSAIC, N. J.



SIMPLICITY SCREENS

do a fast, efficient job of sizing,
separating, dewatering and dedusting
coal for the mining industry



*Illustrated: Heavy duty C-30
horizontal screen.*

SIMPLICITY gyrating, horizontal, simpliflo screens all have their place in the tough job of processing coal. They handle the coarse scalping, size, separate and grade coal, dewater fine coal sludge, and dedust coal in dry screening operations. Special ball tray deck models even screen damp, sticky coal through small mesh screen cloth without blinding. The unique screening actions and the heavy, powerful construction of SIMPLICITY Screens help maintain high daily production rates throughout the coal industry. All model Screens available in a wide range of sizes. For complete information, consult a SIMPLICITY sales engineer or write us today.

124

Sales representatives in all parts of the U.S.A.
FOR CANADA: Canadian Bridge Engineering Co., Ltd.
Walkerville, Ontario
FOR EXPORT: Brown and Siles, 50 Church Street,
New York 7, N. Y.



ENGINEERING COMPANY • DURAND, MICHIGAN

**Promet Bars Stand Up
Where the Going
Is Tough!**



Made from Promet No. 6, an outstanding leaded bearing bronze noted for its free machining properties. Unbelievably great resistance to heat and wear. Will not burn, seize, pound out.

PROMET'S HIGH SAFETY FACTOR IS YOUR INSURANCE AGAINST BEARING FAILURE!

Tougher, harder and stronger, it resists shock loads and withstands high compressive forces and will not cut, or stick to the shaft under ordinary operating conditions. There is no seizing, no scoring—just smooth, quiet operation. Will not powder under the most severe conditions of service. When lubrication fails temporarily, Promet carries on safely until proper lubrication can be restored, affording protection against production shutdowns.

PROMET FULLY MACHINED BARS SAVE YOU TIME, TOOLS AND MONEY!

Completely precision machined inside, outside and on the ends, yet sufficient stock remains for the finishing cut. Can be machined at speeds of more than 500 feet per minute—more than double those of phosphor bronzes. This complete machining insures you against subsurface defects sometimes found in rough cast bars. A considerable amount of metal has already been removed—metal which you would be purchasing if you used rough bars. Every bar is absolutely concentric.

Available round, hexagon and square, in 13-inch lengths, rough cast.

MONEY-BACK GUARANTEE

of longer, superior service and lower maintenance cost.

FREE ADVISORY SERVICE

Our competent design and engineering staff will be glad to assist you in solving your special bearing problems.

Send today for free literature.

**THE AMERICAN
CRUCIBLE PRODUCTS COMPANY**

1307 Oberlin Avenue, Lorain, Ohio

Please send free literature on Promet
Cored and Solid Bronze Bar Stock.

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Firm
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City & State

Among the Manufacturers

Ohio Brass Co., Mansfield, Ohio, and its subsidiaries, have elected two new vice presidents, Roger A. Black, vice president and general factory manager; and Louis J. Ott, vice president and general sales manager. Mr. Black, associated with the company since 1930, worked in both the Barberton and Mansfield factories before joining the sales department's New York office in 1931. He returned to Mansfield in 1932 as manager of the Foreign Trade Dept., and in 1949 was appointed general factory manager. Mr. Ott joined the advertising department in 1928, and was made advertising manager in 1935. During the war years, he handled the company's relations with the War Production Board and in 1949 he was appointed general sales manager.

Cardox Corp., Mining Div., has transferred R. O. Schoor, former sales engineer in Pennsylvania territory, to Pikeville, Ky., as assistant district manager of the eastern Kentucky, Virginia and Tennessee territory. Prior to joining Cardox, Mr. Schoor was general superintendent of mines for the Warner Collieries Co., St. Clairsville, Ohio.

General Motors Corp. has appointed Ernest F. Bentley general sales manager of the Detroit Diesel Engine Div., succeeding the late V. C. Genn. Associated with G. M. since 1934 as an engine designer with the Winton Engine Corp., Cleveland, which later became the Cleve-

land Diesel Engine Div., he came to Detroit Diesel in 1940 as project engineer and prior to his present appointment was operations sales manager. Other appointments announced include Robert V. Baxley, operations sales manager; John C. Campbell, manager of manufacturers' sales; and Louis A. Steele, industrial sales manager.

Ellis J. O'Brien has been appointed chief development engineer for Heyl & Patterson, Inc., Pittsburgh, in charge of the company's research and development department. Before joining Heyl & Patterson, Mr. O'Brien was associated with the Vanadium Corp. of America for 14 yr.

Independent Pneumatic Tool Co., Aurora, Ill., has changed its 60-yr-old corporate name to Thor Power Tool Co. to eliminate confusion and facilitate easier recognition of the company's products. The trade name "Thor" has been used as identification of all the firm's power tools since 1893.

Timken Roller Bearing Co. has named Richard K. McConkey to assistant general manager, Industrial Div., with headquarters in Canton, Ohio. Formerly district manager, in Moline, Ill., he succeeds the late Melvin H. Kuhl.

Westinghouse Electric Corp. has established an Atlanta branch office, providing better service to customers in the area and relieving southeastern district per-



COAL MEN ON THE JOB . . .

MacAlpin Officials Study Accident Prevention

FOREMEN AND KEY MEN at the MacAlpin Coal Co., MacAlpin, Raleigh County, W. Va., who recently completed the 20-lesson course in accident prevention, included this day-shift class: Seated—Lloyd G. Fitzgerald (left), USBM instructor; R. P. Richardson, outside foreman; Donald W. Brown and Richard C. Adkins, section foremen; Clarence Meadows, general assistant foreman; and Cesar J. Reid, electrician. Standing—Bill Mabrey (left), section foreman; J. A. Barltell, general superintendent, holding the USBM Certificate for 100% training of mine officials; C. F. Bane, general foreman; Saul Brown and George P. Henderson, section foremen; Donal E. Brown, supplyman; George D. Darnell, section foreman; J. D. Whetsel, engineer and Woodrow C. Darnell, fireboss.

free!

This 12-page, 8½ x 11-inch illustrated booklet that explains, in complete detail, how you can simplify and save with



PURE OIL INDUSTRIAL LUBRICANTS

Pure Oil specializes in top-quality *multi-purpose* oils and greases—each one designed to do a number of *different* jobs instead of just one specific job. And do each job *equally well*.

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Sales offices located in more than 500 cities, including: Atlanta • Birmingham • Charleston • Charlotte • Chattanooga • Chicago • Columbus • Indianapolis • Jacksonville • Madison • Memphis • Miami • Milwaukee • Minneapolis • Pensacola • Pittsburgh • Richmond

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Company _____

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If you use drags in YOUR washing plant ...Look at these Facts

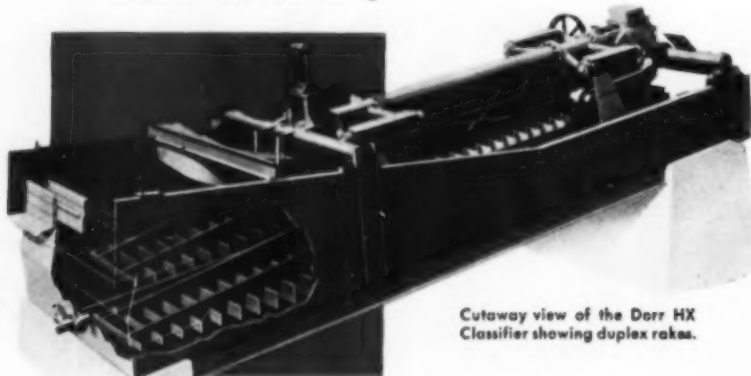
There are three primary reasons why the Dorr HX Classifier will do a better job than drags in your coal cleaning plant... and will save you money in the long run.

Simple design — rugged construction — no submerged bearings... these add up to low maintenance. Long term operating cost records in heavy duty metallurgical work show averages of 0.1 cent per ton of solids raked.

Compact HX design will save up to 50% in headroom over a drag installation on a comparable job.

Because pool area and rake speed can be varied, a Dorr HX can easily be adjusted to handle changes in feed characteristics. Conventional drag design provides for no adjustment.

A Dorr HX will unquestionably produce a cleaner rake product and a more uniformly sized overflow than a drag.



Cutaway view of the Dorr HX Classifier showing duplex rakes.

Consider these four facts... and then think about this. Installed cost of HX's may be somewhat higher than that of drags... but any difference will be quickly offset by low HX maintenance.

Bulletin #2281 gives further details on the HX. Write to The Dorr Company, Engineers, Stamford, Conn.



Better tools TODAY to meet tomorrow's demand

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.
Offices, Associated Companies or Representatives in principal cities of the world.

sonnel of direct local supervisory duties. Thomas Fuller Jr., appointed branch manager, joined Westinghouse in 1935 and since 1948 has been manager of the Chattanooga, Tenn., branch office. Other personnel appointed were: M. A. Land, sales supervisor; S. M. Morton, office manager; George W. Miller, distribution apparatus manager; T. J. Woth, Atlanta branch engineering manager; and G. W. Alexander, branch service manager. J. J. Hill was appointed manager of the Chattanooga office, succeeding Mr. Fuller. J. P. Coughlin has been named manager of Westinghouse's arc-welding department. Mr. Coughlin joined Westinghouse in 1939 as welding sales engineer for the southwestern district. In 1945 he was made manager of welding products and specialty sales department, E. Pittsburgh, and became manager of field sales for the welding department in 1949.

Mack Motor Truck Corp., New York, has appointed K. L. Fitts manager of off-highway truck sales. Mr. Fitts joined the company in 1945 as a national accounts salesman, and in 1951 was made assistant manager of that division. In his new position he succeeds P. J. Fleming, who recently retired after a long career with Mack.

Lincoln Engineering Co., St. Louis, has appointed T. V. Picraux production manager of both the company's plants. Albert J. Gruenewald, formerly a sales engineer, succeeds Mr. Picraux as sales manager of the Industrial Div. Robert E. Redenbaugh has been named manager, Original Equipment Div., directing sales of lubricant application devices to the original equipment market. Joining the company in 1942, Mr. Redenbaugh served in the product design and sales engineering departments prior to his appointment.

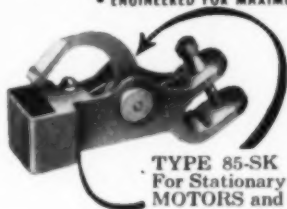
Firth Sterling, Inc. has named J. Martin Stokes assistant general sales manager-administration. Joining Firth Sterling's Detroit office in 1928, he served as office manager in Detroit and Pittsburgh and since 1950 has been assistant manager of the Carbide Sales Div. Kenneth F. Julin, office manager, Carbide Sales Div. since 1950, succeeds Mr. Stokes. E. G. Moffat, manager, Mining Div. since 1951, has been named manager, Carbide Sales Div., succeeding C. R. Harmon, who resigned. Fred Lord, assistant chief production engineer, has been appointed chief engineer, Mining Sales Div.

General Electric Co., Schenectady, N. Y., has discontinued operation of the Small and Medium Motor Dept. and has decentralized it into three new product organizations for the better over-all allocation of manufacturing facilities and marketing functions. A divisional marketing department was also established to facilitate unification of all division marketing policies. Heads of the four new departmental organizations are: Marketing Dept., Walker H. Henry, manager; Medium Induction Motor Dept., Olaf F. Vea, general manager; Direct Current Motor and Generator Planning Study, Oscar L. Dunn, man-

Down With "Down-Time"!

Specify FLOWER Brush Holders

- SAVE VALUABLE TIME
- GET PEAK PRODUCTION
- ENGINEERED FOR MAXIMUM PERFORMANCE



TYPE 85-SK
For Stationary
MOTORS and GENERATORS

• Why spend your profits on "down-time"? Maintenance men everywhere are specifying proven FLOWER Brush Holders. They last longer, save maintenance dollars and help eliminate costly "down-time".

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1217 SPRING GARDEN ST., PHILA. 23, PA.

Pittsburgh • Cleveland • Chicago • Detroit • St. Louis • Princeton, W. Va. • Los Angeles

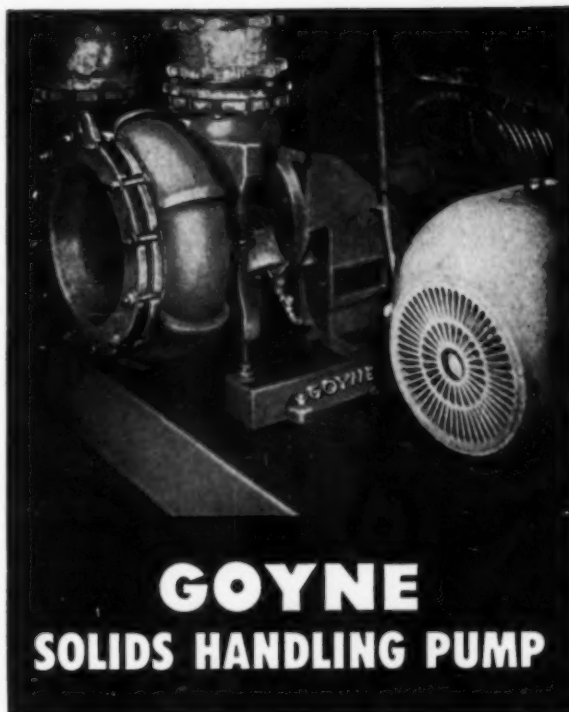


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ALBERT pipe supply co., inc.
BERRY AT NORTH 13TH ST. • BROOKLYN 11, N. Y.



GOYNE SOLIDS HANDLING PUMP

Feature: LOW-COST OPERATION

GOYNE SOLIDS HANDLING PUMPS are extremely popular with a very large number of coal companies who find them quite reliable for pumping:

Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

Disposing of refuse and silt by pumping to waste material banks or for back filling into mined out areas.

Pumping prepared coal to temporarily desired storage areas.

These specially designed Goynes incorporate numerous features to reduce upkeep and labor maintenance costs to a minimum:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing *only the rear head of the pump*. No suction or discharge piping or any other major part of the pump is disturbed.

2. The only packing box of the pump is subjected to the low suction pressure rather than to the discharge pressure developed by the pump. This feature assures long packing and shaft sleeve life.

3. Impeller clearance is adjusted while the pump is running, insuring constant pump capacity so essential for uniform washing.

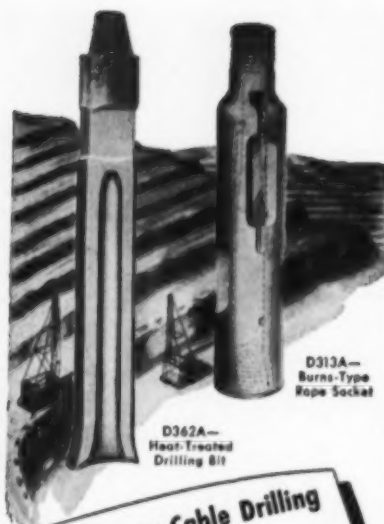
4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goynes Process Pumps.



All inquiries are given a thorough engineering analysis and our prompt attention.

The GOYNE STEAM PUMP CO.
ASHLAND, PA.



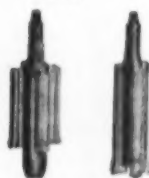
For Churn or Cable Drilling of

- BLAST HOLES
- PROSPECT HOLES
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SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

D606—Reamer-Type Pilot Bit



LARGE BITS

for pilot hole drilling and step enlargement reaming of dewatering, ventilation and escape holes.

D370F—Prefabricated Shot Bit



ager; and Synchronous and Specialty Motor and Generator Dept., Fred B. Hornby, general manager. Headquarters for the first three organizations will be at Schenectady, N. Y., and for the latter, Lynn (Mass.) River Works. Joe T. Farrell has been named manager of marketing, Medium Induction Motor Dept., and David A. Yates, manager of marketing, Synchronous and Specialty Motor and Generator Dept.

Frank G. Hough Co., Libertyville, Ill., has appointed G. A. Tamblin sales manager. Mr. Tamblin, with the company 11 yr, has been assistant sales manager since 1948.

A. C. Brown Jr. has been appointed general sales manager, Air Reduction Sales Co., Div. of Air Reduction Co., Inc., New York. Mr. Brown joined Air Reduction in 1935, serving in various capacities including salesman and branch manager, and since 1950 has been manager of the central region with headquarters in Pittsburgh. J. H. Keeney, administrative assistant in Pittsburgh, succeeds Mr. Brown as regional manager. J. H. Hart, Detroit district manager, succeeds Mr. Keeney, and R. A. Jamieson, assistant sales manager, Detroit, succeeds Mr. Hart. Its new liquid-oxygen plant in Butler, Pa., which recently began production, represents a capital outlay of "several million dollars," Air Reduction reports. Supplying oxygen directly by pipe line to two Butler customers, the plant, which has a rated capacity of 100 tons of liquid oxygen per day, permits an expansion of delivery distances and offers additional economy and convenience in transportation and storage. The Butler plant will also produce argon and nitrogen and will sell gases to industrial customers throughout the Midwest.

Rockbestos Products Corp., New Haven, Conn., has named Edward J. Parker district sales manager for St. Louis and Edward J. Langhenry sales representative, Chicago district sales office. Mr. Parker, formerly associated with Peter Kiewit Sons Co., succeeds Richard H. Bamford, who is now assistant sales manager for the company. Mr. Langhenry was with the Westinghouse Electric Co. for 2 yr before joining Rockbestos. John A. Stefan Jr. has been transferred to Chicago as office and warehouse manager. Joining the company in 1947, he has been priorities advisor in the New Haven sales office.

Chain Belt Co., Milwaukee, Wis., has appointed Gilbert J. Schuelke assistant sales manager, Chain and Transmission Div. Starting with Chain Belt in 1936, he has served in various engineering and sales assignments in the Milwaukee works, and in district sales offices in Atlanta and Milwaukee.

Goodyear Tire & Rubber Co., Akron, Ohio, has named R. B. Warren manager of the industrial products departments. L. W. Adams succeeds Mr. Warren as Southern sales manager of the division. Joining Goodyear in 1927 as an industrial products field representative, Mr. Warren was district manager at Pitts-

RECLAIM YOUR SLURRY !

To go "all out" for COAL Production, reclaim your SLURRY Coal—No other means will accomplish this more economically than a C·M·I CENTRIFUGAL COAL DRYER !

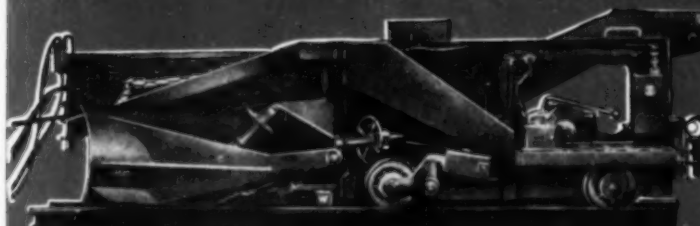
C·M·I Centrifugal DRYERS

**Write or Wire! Let us
tell you all about it.
No obligation, of course.**

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INDUSTRIES**

146 President St., St. Louis 18, Mo.

Now . . . Track Cleaning Cost is \$ 0 Minus ! !

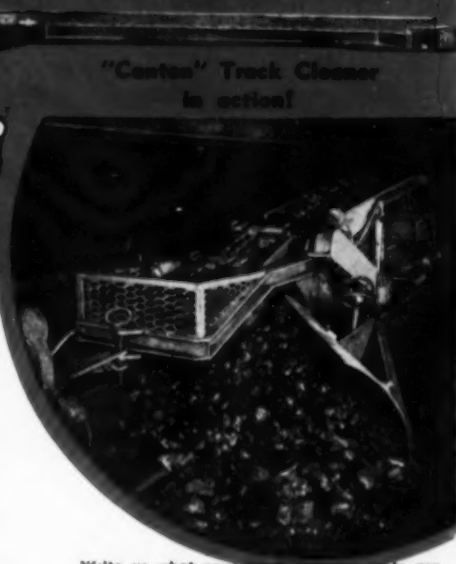


Tracks Cleaned at a Profit

Today, track cleaning is not a costly headache . . . it is a pleasant, profitable operation. No track workers to get hurt. Clean tracks once thoroughly with the Canton Track Cleaner. Then subsequent cleanings yield good coal. Load cars higher, haul more tonnage. Reclaim spillage mechanically. Write us for name of nearest mine where you can make inspection.

Performance Records . . .

893 three-ton cars, on time and one-half, were loaded with machine at a cost of \$.462 per ton. Hand loading (estimating five 3-ton cars per man per shift) would cost \$1.31 per ton. Total cost at \$19.575 per shift for 893 cars with machines — \$1237.70. Same number of cars, hand loading, would cost — \$3509.49. Would the saving of \$2271.79 have any effect on your cost per ton of coal? Another company loaded 887 tons at a cost of \$.465 per ton cleaning 27860 ft. of track at \$.015 per foot. (Names on request.)



Write us what your track cleaning costs are and how many miles of track you clean, and we will show you how much extra profit you can make with a "Canton" Track Cleaner, after it has paid for itself.

Write for complete data. Please give street and home numbers.

American Mine Door Company

2057 Dasher Ave.

Canton 6, Ohio

Mechanical Track Cleaners • Automatic Doors • Substitutions • Car Transfers • Automatic Switch Systems

Cable Splicers and Vulcanizers

MOVE IT

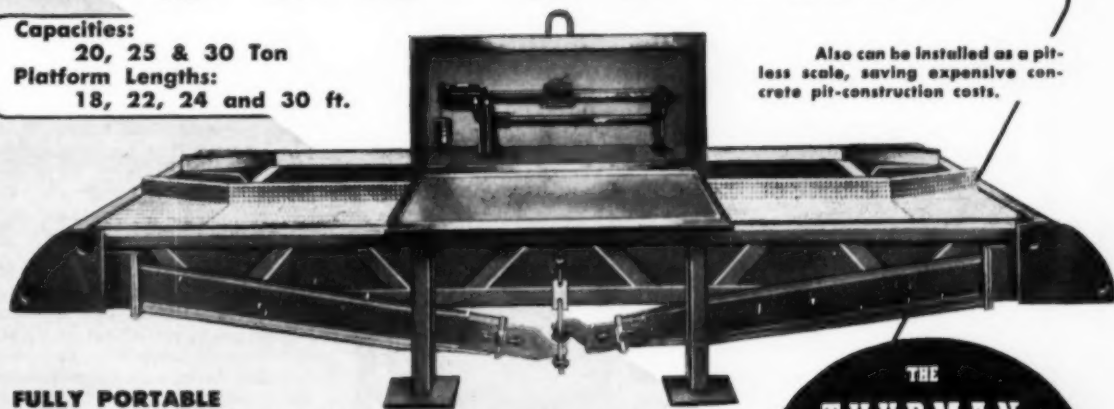
TO THE JOB

Capacities:

20, 25 & 30 Ton

Platform Lengths:

18, 22, 24 and 30 ft.



Also can be installed as a pit-less scale, saving expensive concrete pit-construction costs.

FULLY PORTABLE

This scale can be moved from job to job as a unit merely by removing the six bolts which hold the side levers in place. The assembled scale can then be lifted and loaded on a truck for transporting. Once positioned, it can be ready for use in minutes.

ACCURATE and PRECISE

Perfectly balanced for lifetime accuracy. Wide steel bases, at both ends, support scale, therefore require no concrete footings.

Easy-to-read weighbeam is chrome-plated. Other vital parts are electro-plated against corrosion.

THE
**THURMAN
PORTABLE
TRUCK SCALE**

Est.
1918

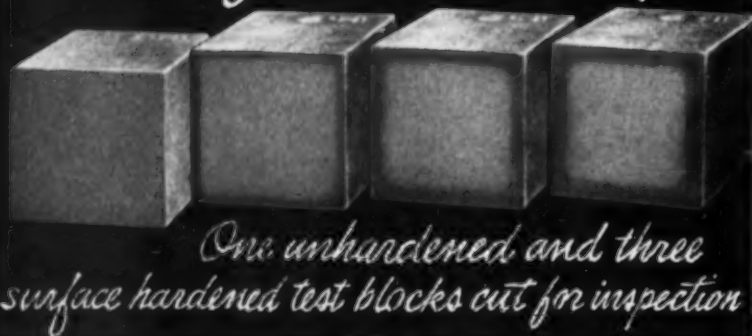
THURMAN MACHINE CO.

SCALE
DIVISION

156 North Fifth Street
Columbus, Ohio

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*Depth is Important in
Surface Hardening*



*One unhardened and three
surface hardened test blocks cut for inspection*

PITTSBURGH

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*-Your Guarantee
of Longer Life*



The exact depth of surface hardening is one of the most important factors in the exclusive **PITTSBURGH Armored Gear** formula. The metal, machining, and overall heat-treating are very important in the long service life of **PITTSBURGH GEARS**, and with surface hardening to the correct depth for the use the gears will be put to, you can expect unusually long service.

PITTSBURGH Armored Gears are guaranteed to give five times the life of untreated gears, one to one and one-half the life of oil-treated gears, and equal or longer life than any other gear in identical service. **Armored Gears** are quickly identified by their distinctive corrosion preventive coating of "**Pittsburgh Purple**."

Check today with your nearby **PITTSBURGH GEAR** distributor. He stocks standard renewal gears and parts and can save you money. If you don't know him, write us for his name.

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COAL MEN ON THE JOB

BLACK STAR COAL CORP., Alva, Harlan, County, Ky.: Earl Ward (seated), preparation-plant foreman; and C. E. Herrin, preparation-plant electrician.

burgh from 1947 to 1949 before becoming Southern sales manager. Mr. Adams, who has been Pittsburgh district manager for the division since 1949, joined Goodyear in 1943. Samuel J. Mabry, industrial products representative at Los Angeles since 1948, has been appointed Atlanta (Ga.) district manager for the Industrial Products Div.

Wellman Engineering Co., Cleveland, has named Fred B. Shew sales manager of the bucket department, supervising the national distribution of "Williams" line of clamshell and dragline buckets, log and stone grabs. Mr. Shew formerly was district manager of the Chicago office, and before that served as district manager of the New York office.

Gould-National Batteries, Inc. has appointed W. H. Burkey district manager, Industrial Div., in the St. Louis area. Mr. Burkey has been associated with the battery industry for more than 35 yr, and has been with Gould-National and its predecessor companies since 1930.

Howe Scale Co., Rutland, Vt., has promoted Gale P. Foster to manager of the Cleveland branch and Joseph G. Haegele Jr. to manager of the Kansas City branch. Mr. Foster, formerly sales promotion manager, was recently released from active duty with the U. S. Air Force. Mr. Haegele was formerly sales representative, St. Louis branch.

Gar Wood Industries, Inc., Wayne, Mich., has promoted J. H. Howerth Jr. to assistant sales manager of the Wayne Div. Mr. Howerth served as chief sales engineer for that division until his recall to military service 2 yr ago.

Hewitt-Robins, Inc., Stamford, Conn., has named Harold E. Kleintop manager of wire product operations with responsibility for production and sales at its wire screen cloth plant in Philadelphia.

Mr. Kleintop was vice president and chief engineer of the plant when it was sold by the Korb-Pettit Wire Fabrics & Iron Works, Inc., to Hewitt-Robins in March, 1952. Since then, productive capacity has been increased 40% and a further increase of more than 60% is expected shortly.

Barber-Greene Co., Aurora, Ill., has appointed Rish Equipment Co. as exclusive distributor in the Cincinnati area, representing Barber-Greene in the Ohio counties of Adams, Brown, Butler, Clermont, Clinton, Hamilton, Highland, Lawrence, Montgomery, Preble, Scioto, Warren and Pike; in Kentucky, the counties of Boone, Campbell and Kenton; and in Indiana, the counties of Dearborn, Franklin, Ohio, Ripley and Switzerland. C. I. Johnston is manager of the Rish Cincinnati operation, with offices at 1212 Dalton Ave., and assistant manager in charge of sales is Charles Riggs.

Koppers Co., Inc., Pittsburgh, has appointed the following to posts in the Engineering and Construction Div.: R. J. Sprott, chief engineer since 1951, has been named assistant production manager; S. C. Carden, assistant chief engineer since 1951, succeeds Mr. Sprott; A. D. L. Orefice, manager, by-product section, succeeds Mr. Carden; and C. G. Barnett succeeds Mr. Orefice as manager of the by-product section of the division's engineering department.

Electric Steel Foundry Co., Portland, Ore., opened a new branch office in Salt Lake City, Utah, Feb. 1, with a territory comprising Utah, Colorado, southeastern Idaho and southwestern Wyoming. Garland T. Allen, representing ESCO in the Portland area for 11 yr, is manager of sales, with offices at 1455 S. Second West.

Fruehauf Trailer Co. has named Leslie E. Baker manager of the Toledo, Ohio, branch. Associated with the company for 18 yr, Mr. Baker for the last few years has been with the Kansas City branch as sales manager.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has named George F. Cobb and Rudolph J. Ramstack Jr., assistant engineers in the crushing, cement and mining machinery sections of its processing machinery department. Mr. Cobb, a mechanical-engineering graduate of the University of Wisconsin, and Mr. Ramstack, a mining-engineering graduate of the Missouri School of Mines, both recently completed an Allis-Chalmers training course for graduate engineers.

American Brake Shoe Co., National Bearing Div., has appointed Sam R. Watkins executive vice president, with headquarters in St. Louis. Mr. Watkins joined the company in 1939 as a member of the sales department, Brake Shoe & Castings Div. In 1949 he was named district sales manager for the division and in 1951 became assistant vice president.

Reliance Electric & Engineering Co., Cleveland, Ohio, has appointed Amature & Electric Machine Co., 1485

Serves well

Saves well...



Hendrick Flanged Lip Screens

Shaking and vibrating screens that blind and afford poor service life can waste valuable time and money — eat up profits. The tapered shape of openings and the steps or flanges of Hendrick Flanged Lip Screens provide better separation and practically eliminate costly delays due to blinding.

Ideal for shaking and gravity screens and discharge chutes Hendrick Flanged Lip Screens are furnished with openings varying in size from .010x.025x½ to 10½x11½x13. For more complete information write to Hendrick direct.



Hendrick

MANUFACTURING COMPANY

41 DUNDAFF STREET, CARBONDALE, PA.

Sales Offices in Principal Cities

PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS
ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING • SHURE-SITE TREADS • ARMORGRIDS

CONTROL Your Water Problems with the *Flood City* PLUNGER PUMP



Power end is made of hi-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 5 x 9; Capacity, 50 gals. per minute, 2" suction and 2" discharge.

This pump uses the leak-proof, acid-resistant FLOOD CITY REVERSIBLE WATER END—standard for replacement purposes in large and small coal mines. Write for more information on this and other Flood City Mining Equipment.

Flood City Brass & Electric Co.

Messenger and Elder Streets • JOHNSTOWN, PA.

Branch Office: 4 Virginia St. W., Charleston, W. Va.

"There's
only
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Keosauqua Way, Des Moines, Iowa, sales agent and distributor for Reliance motors and motor drives. Dale D. Drollinger, who joined Reliance in 1950 and was with the Cincinnati sales application engineering staff since last April, has been named branch manager at Rockford, Ill. Daniel J. Donnelly, in the Philadelphia office for 2 yr, succeeds Mr. Drollinger.

Bowers Battery & Spark Plug Co., Reading, Pa., has appointed three industrial battery specification engineers, James J. Law Jr., R. E. Jaccard and James Peterman, to its sales and engineering staff. Mr. Law, formerly with the Sinclair Refining Co., will cover central and eastern Pennsylvania, with the exception of Philadelphia. Mr. Jaccard will cover Philadelphia, southern New Jersey and south to Richmond. Mr. Peterman, formerly on the sales staff of the Pittsburgh branch, will have a territory including western Pennsylvania, eastern Ohio and West Virginia.

Norton Co., Worcester, Mass., has named William C. Davidson abrasive engineer for the West Virginia territory. A former instructor of human relations in the sales training department, and more recently a grinding engineer in the precision grinding section of the engineering department, Mr. Davidson joined Norton in 1945.

Electric Furnace Man, Inc., Emmaus, Pa., has appointed Robert B. Sechrist vice president in charge of sales, and Fred L. Hilder vice president in charge of engineering and member of the board of directors. Mr. Sechrist, acting sales manager since 1952, was sales manager of the B. W. Sechrist Co., Easton, Pa., before joining E. F. M. as assistant sales manager in 1949. Mr. Hilder joined the company in 1933.

Westinghouse Electric Corp., Motor and Control Div., Buffalo, N. Y., has produced its "one-millionth" motor since the opening of the plant in 1946. Completion of the 7½-hp Life-Line motor culminated production of 10,009,292 horsepower of capacity in electric motors, using more than 13,000 tons of copper, 110,000 tons of steel, and 1,400 tons of aluminum during the 6 yr of production, the company reports. Although the motor, bearing a special name plate, will be packed and shipped in the normal manner, eventually it will be returned to the plant for display and \$100 will be awarded to the person who discovers it in the interim.

Koppers Co., Inc., Feb. 5, informally dedicated its new plant at Fontana, Calif., with a tour and luncheon attended by more than 400 industry, business and civic leaders of the Fontana and Los Angeles areas. Operated by the Tar Products Div., it is now producing a general line of products made from the crude tar from Kaiser Steel Corp.'s chemical-recovery coke ovens. Following the luncheon, Fred C. Foy, vice president and general manager, Tar Products Div., introduced the speakers.



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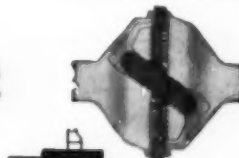
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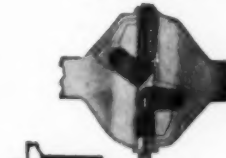
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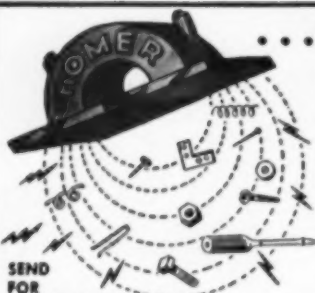
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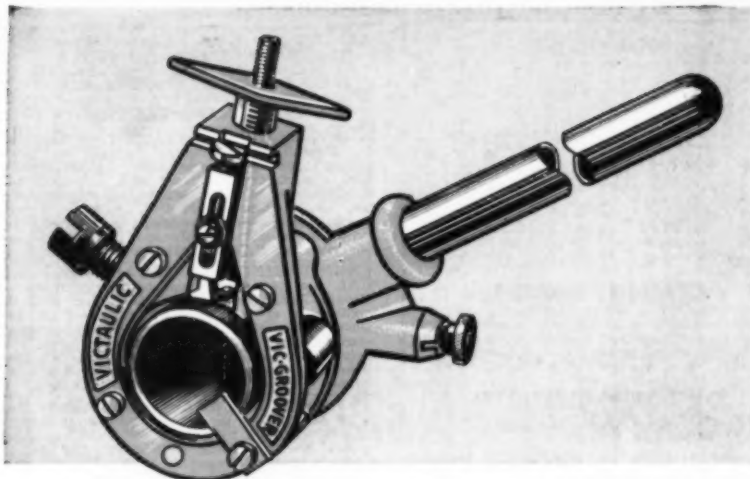
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- 1—4 ton Ironton, battery, 36" ga.
- 2—7 ton G. E. permissible battery, 36" ga.
- 1—7 ton Atlas, battery, 36" ga.
- 3—8 ton Ironton, 36" ga.
- 2—8 ton General Electric, battery 36" ga.
- 4—10 ton Atlas, battery, 36" ga.
- 1—3 ton Whitcomb gas engine driven, 24" ga.
- 1—2½ ton Jeffrey trolley, 36" ga.
- 1—4½ ton Goodman trolley, 36" ga.
- 1—5 ton Jeffrey trolley, 36" ga.
- 1—6 ton Goodman trolley, 36" ga.
- 2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

- 1—24" x 24" Jeffrey Single Roll
- 1—24" x 36" McNally-Pittsburg Double Roll
- 1—30" x 45" Jeffrey Single Roll
- 1—30" x 16" Williams Pulverizer
- 1—36" x 40" Jeffrey Double Roll
- 1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

- 2—5 HP Brownie Room Hoists
- 3—5 HP Sullivan RH single drum Room Hoists
- 1—7½ HP Sullivan double drum Slusher Hoist
- 2—10 HP Sullivan 3 drum Slusher Hoist
- 1—25 HP Sullivan 2 drum Slusher Hoist
- 1—Ingersoll-Rand Model 1H Air Tugger Hoist
- 1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
- 1—Ingersoll-Rand Model EU Air Tugger Hoist
- 2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
- 7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
- 1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

ELECTRIC HOISTS

- 1—11 HP Vulcan #0 single drum
- 1—20 HP Vulcan single drum
- 1—22 HP Vulcan double drum
- 1—25 HP Vulcan single drum
- 1—30 HP Vulcan single drum
- 1—37 HP single drum
- 5—50 HP single drum
- 2—60 HP single drum
- 4—100 HP Box single drum
- 1—112 HP Vulcan single drum
- 1—145 HP Vulcan single drum
- 2—150 HP Vulcan single drum
- 1—375 HP Box single drum
- 1—600 HP Box single drum

BOX CAR LOADERS

- 2—Ottumwa 20 HP Box car loaders
- 3—Maniere 22 HP Box car loaders
- 1—Jeffrey 20 HP Box car loader

MINING MACHINES

- 2—7B Sullivan super short wall coal cutters
- 18—CE7 Sullivan coal cutters
- 1—CR3 Sullivan coal cutter
- 1—Jeffrey 28A coal cutter
- 6—Goodman 112-A coal cutters
- 1—Sullivan CH-11 ironclad shearing machine
- 1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

- 2—8BU Joy loaders
- 2—6IEW Jeffrey elevating chain conveyors
- 1—61HC Jeffrey chain conveyor, 90'
- 1—61W Jeffrey chain conveyor, 200'
- 9—G-20 Goodman shaker conveyors
- 10—G-15 Goodman shaker conveyors
- 8—Vulcan shaker conveyors
- 2—Joy ladel UN-17 shaker conveyors
- 10—Goodman HA duckbills

MINE FANS & BLOWERS

- 2—8-H Jeffrey 42" Aerodyne Fans
- 1—Jeffrey 8 x 4 Fan
- 5—Jeffrey A61 exhaust blowers
- 8—Jeffrey Aerodyne midget blowers

SCALES

- 3—100 ton Fairbanks railroad scales
- 1—100 ton Howe railroad scale
- 1—125 ton Howe railroad scale
- 1—5000# Fairbanks Tipple scale with weighing basket
- 1—5000# Howe Tipple scale

STORAGE BINS

- 3—50 ton capacity steel bins
- 2—100 ton capacity steel bins

TIPPLE EQUIPMENT

- 1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
- 1—4 deck card shaker screen, 18' long, driven by 50 HP motor
- 1—Card rotary car dumper
- 1—Bucket Elevator, 36'6" centers, 18" x 11" x 9" buckets.

- 1—Bucket Elevator, 45' centers, 6" x 4" buckets
- 1—Bucket Elevator, 48'8" centers, 10" x 6" buckets
- 1—Jeffrey picking table, 19' centers, 36" wide
- 1—Jeffrey picking table, 19'8", 36" wide
- 1—Jeffrey Drag Conveyor, 88'6", 36" flights
- 1—Jeffrey Drag Conveyor, 72', 30" flights
- 1—Jeffrey Drag Conveyor, 67', 30" flights
- 1—Jeffrey Drag Conveyor, 69'6", 28" flights
- 1—Link Belt Drag Conveyor, 50', 15" flights
- 1—32" x 9'6" Card vibrating screen
- 1—4' x 6'6" Link Belt jig washer
- 1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
- 1—Loading boom, 55' centers, 48" flights
- 1—Loading boom, 45' centers, 30" flights
- 2—Card self dumping mine cages
- 2—Card 84" bicycle sheave wheels
- 1—24" Belt conveyor, 40' centers
- 1—24" Belt conveyor, 13' centers
- 1—24" Belt conveyor, 135' centers
- 1—24" Belt conveyor, 66' centers
- 1—30" Belt conveyor, 173' centers
- 1—Red Devil egg loader, 16" flights
- 1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

- 1368'—#10 Parkway cable 3/c, 7200 volt
- 2977'—#8 Parkway cable 3/c, 7200 volt
- 262'—#8 Parkway cable 3/c, 600 volt
- 1900'—#6 Parkway cable, 3/c, 7200 volt
- 970'—#2/0 Parkway cable, 600 volt
- 2,098'—#6 Tirez cable, 600 volt, 3/c
- 1417'—#4 Tirez cable, 3/c, 600 volt
- 547'—#2 Tirez cable, 3/c, 600 volt
- 1022'—#12 new Tirez cable, 4/c, 600 volt
- 5250#—300,000 CM stranded w.p. 1/c
- 14122'—#1/0 stranded r.c., 1/c
- 16682'—#4 stranded r.c., 1/c
- 2300'—#4/0 stranded r.c., 1/c
- 1705#—#4 solid bare
- 5467#—#2 solid bare
- 2600#—#1 solid bare
- 1255#—#1/0 solid bare
- 2975'—type TTHFA-60 new telephone cable

PIT CARS

- 160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
- 125—60 cu. ft. Card steel coal mine cars, 36" ga.
- 88—66 cu. ft. Card steel coal mine cars, 36" ga.

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12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
22"	4	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
26"	4	1/8"	1/32"	28 Oz.
28"	4	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/32"	28 Oz.
32"	4	1/8"	1/32"	28 Oz.
34"	4	1/8"	1/32"	28 Oz.
36"	4	1/8"	1/32"	28 Oz.
38"	4	1/8"	1/32"	28 Oz.
40"	4	1/8"	1/32"	28 Oz.
42"	4	1/8"	1/32"	28 Oz.
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46"	4	1/8"	1/32"	28 Oz.
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- 13—Jeffrey A-7 Hand Held—250 Volts
- 9—Chicago Pneumatic 571—Hand Held—250 Volts
- 4—Jeffrey A-6 Post Mounted—250 Volts
- 2—Chicago Pneumatic 574 Post Mounted—250 v.
- 1—Cleveland S115 Stoper Drill

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- 8—Goodman E-11 Units—Complete—250 Volts
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- 3—Jeffrey 52 B—26" Belt Conveyors—Complete

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- 6-6 ton Jeffrey MH-88
- 4-6 ton Marcha Battery Type 48 cell, C-61-6 mtrs 42" ga.
- 5-13 ton G.E. 42" ga.
- 20-6 ton Goodman 42" ga.
- 3-8 ton Goodman 42" ga.
- 3-15 ton Westinghouse 42" ga.
- 8-5 ton GE Battery, 36" ga. (with batteries)
- 5-5 ton Marcha Battery, 36" (with batteries)
- 2-12 ton Jeffrey, 42" ga.
- 2-12 ton G.E. 42"
- 6-5 ton GE Battery, 42"
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- 25-Jay Loaders, 250 DC, 42" ga. 7 & 5 BU
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- 10-Goodman Shortwall Cutting Machines

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- 50-Type 473 Dooley Bros. Elec. Coal Drills

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- 150-4 ton steel mine cars, 42" ga. 'E' dump
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- 200-3 ton 42" ga. ACF Mine cars, Timken
- 200-2 1/2 ton ditto
- 10-Charging panels for shuttle car batteries

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- 1-1500 KW Allis Chalmers 2400 V Generator, comp.
- 1-700 KVA GE
- 2-150 KW Westinghouse MG set 2300 V.
- 1-300 KW GE
- 1-75 Westinghouse MG set

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300 KW Rids. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v. 1200R-Syn. 440 v.
300 KW West. 275 v. 1200R-Syn. 440 v.
200 KW G.E. 275 v. 1200-MPC-AT1 2300/4000 v.
200 KW Rids. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. 5K-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-AT1 2300/4000 v.
150 KW G.E. 275 v. 1200 R MPC-AT1 2300/4000 v.
100 KW Rids. 275 v. 1200R-Syn. 2300 v.
100 KW Rids. 275 v. 1200R-Syn. 2300 v.
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8 Ton Goodman 550 v. 42"/44" ga.
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200 KW G.E. 275 v. MCC6-1200R. 2200/4000 v.
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300	G.E.	450	NY	S.R.
150	G.E.	600	AT1	Syn.
2-100	G.E.	450	1M	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	M.T.	S.R.
30	G.E.	900	KT	S.C.
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Might
Need
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"He never was much for letter-writing when he was in college. But he must know how anxious Mother and I are . . . now that he's off in Korea. Haven't heard from him in six weeks. Of course, they say 'no news is good news' . . . but I wonder. Maybe he can't write . . . because . . . maybe he's in a hospital somewhere. And maybe he needs blood. I don't know . . . but

I'm not taking any chances. That's why I'm giving blood."

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Give Blood Now
CALL YOUR RED CROSS TODAY!
NATIONAL BLOOD PROGRAM



Business Executives!

✓ Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Blood-mobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of co-operation?
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- ☐ Have you conducted a Donor Pledge Campaign in your company?
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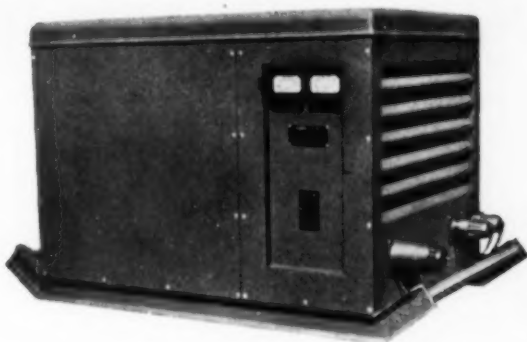
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DELIVERY IN 30 TO 60 DAYS.
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A new high in Mining Efficiency



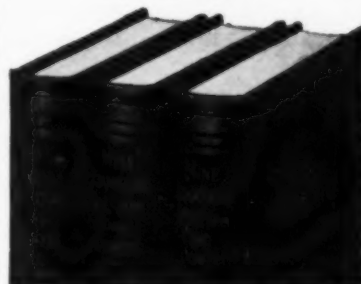
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Can a miner live in air in which the oxygen content is reduced to 17 per cent?

Name five duties imposed on mine foremen by law.

What are the advantages and disadvantages of a gasoline pump, an air pump, and an electrical pump?

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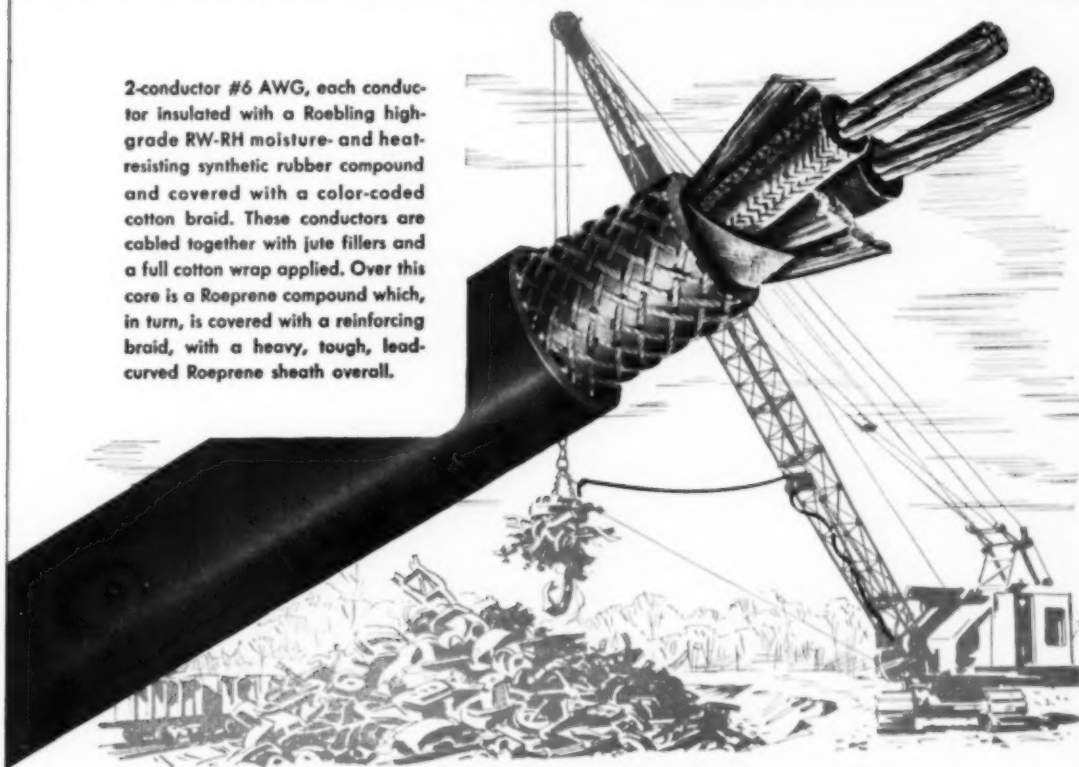
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ROECLAD PORTABLE POWER CABLES

2-conductor #6 AWG, each conductor insulated with a Roebling high-grade RW-RH moisture- and heat-resisting synthetic rubber compound and covered with a color-coded cotton braid. These conductors are cabled together with jute fillers and a full cotton wrap applied. Over this core is a Roeprene compound which, in turn, is covered with a reinforcing braid, with a heavy, tough, lead-curved Roeprene sheath overall.



Roebling Roeclad Lifting Magnet Cables outlast all others 2 to 1

Roebling Roeclad Lifting Magnet Cable is engineered and produced to withstand rough treatment and to give long service life. The design of this cable is based on field experience of more than 30 years.

Exhaustive tests performed in Roebling laboratories to prove the superiority of Roeclad Lifting Magnet Cables included fatigue and impact tests of representative samples.

In a fatigue test, cable samples after being subjected to more than 2,000,000 reversals—half at room temperature and half at 0°F.—showed no damage to either of the two conductors.

In impact tests, it required over 3000 blows of

a 20-lb. weight dropped 5½ inches, 25 times per minute, to cause failure of a two-conductor #8 AWG Roeclad Lifting Magnet Cable.

And a report from an engineering company which has a large number of machines equipped with magnets is typical of the entire field...that Roeclad Lifting Magnet Cable out-performs competitive cables by at least 2 to 1.

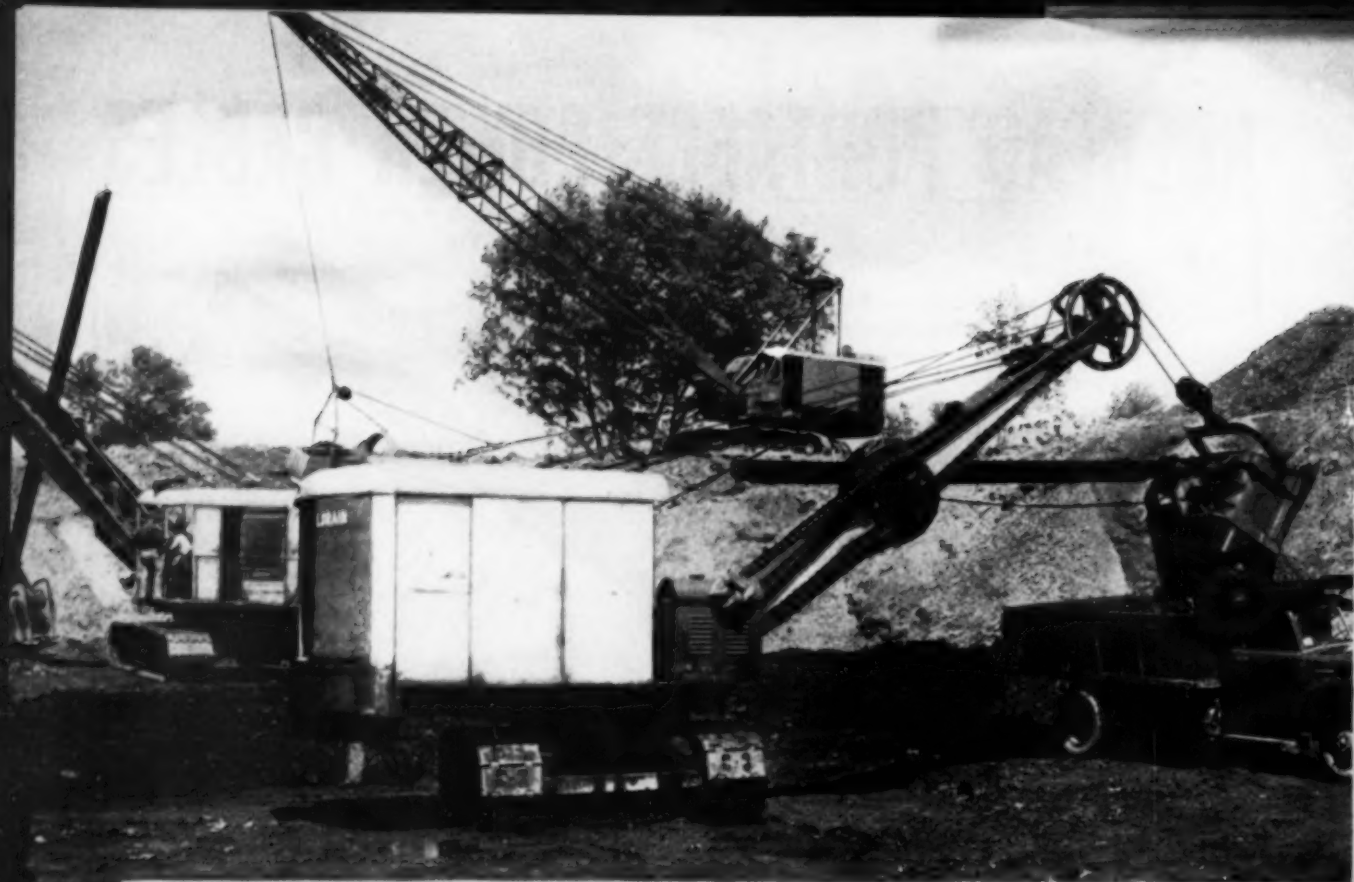
Through unending research and development, Roebling's complete electrical line is constantly being improved. You can always buy Roebling with assurance of top efficiency and economy. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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CAT* Diesel Power *across the board*

Three Caterpillar Engines are at work in the S. C. Monnie Coal Co. strip mine, near Clymer, Pa.

The two Lorain shovels in the foreground are powered by Cat D13000s. In the Link-Belt dragline there's a D17000. And other equipment includes a D7 Tractor and a Caterpillar Motor Grader.

S. C. Monnie has found that standardization on the big yellow engines pays off. He says: "We use *all* Caterpillar Engines for convenience and good dealer service. We also like the simplicity of design."

One of the D13000 Engines on this job has run well over 20,000 hours with no repairs except injection valve replacement and a new thrust bearing in the governor. That kind of long life and dependability is *built into* Cat Engines. And to add to their economy, they deliver full power on No. 2 furnace oil without fouling. Leading manufacturers

of excavating and construction equipment can supply Caterpillar Engines in their machines. Engines are available in 12 sizes up to 500 HP, and electric sets to 315 KW.

For replacement of your present power see your Caterpillar Dealer. He backs every machine he sells with experienced service and genuine factory parts. Ask him for on-the-job proof today.

Caterpillar Tractor Co., Peoria, Illinois.

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**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**



TRU-LAY Preformed WIRE ROPE

● For each use there is *one best* wire rope . . . one that will stand repeated loading, abrasion, crushing, or continuous bending, and be the best rope to buy.

To achieve this, there is a TRU-LAY Preformed Wire Rope made in a special construction for your equipment. This construction has the exactly right combination of strength, bending life, and resistance to wear and crushing that you need.

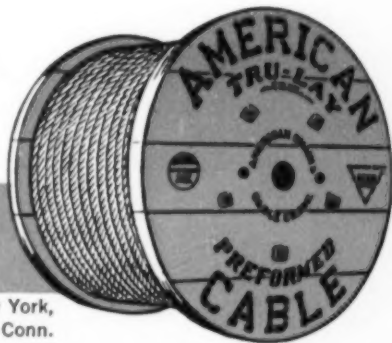
The one best wire rope . . . TRU-LAY Preformed . . . will last you longer and cost less to use. Specify and get TRU-LAY Preformed improved plow steel—the rope identified by the Green Strand.

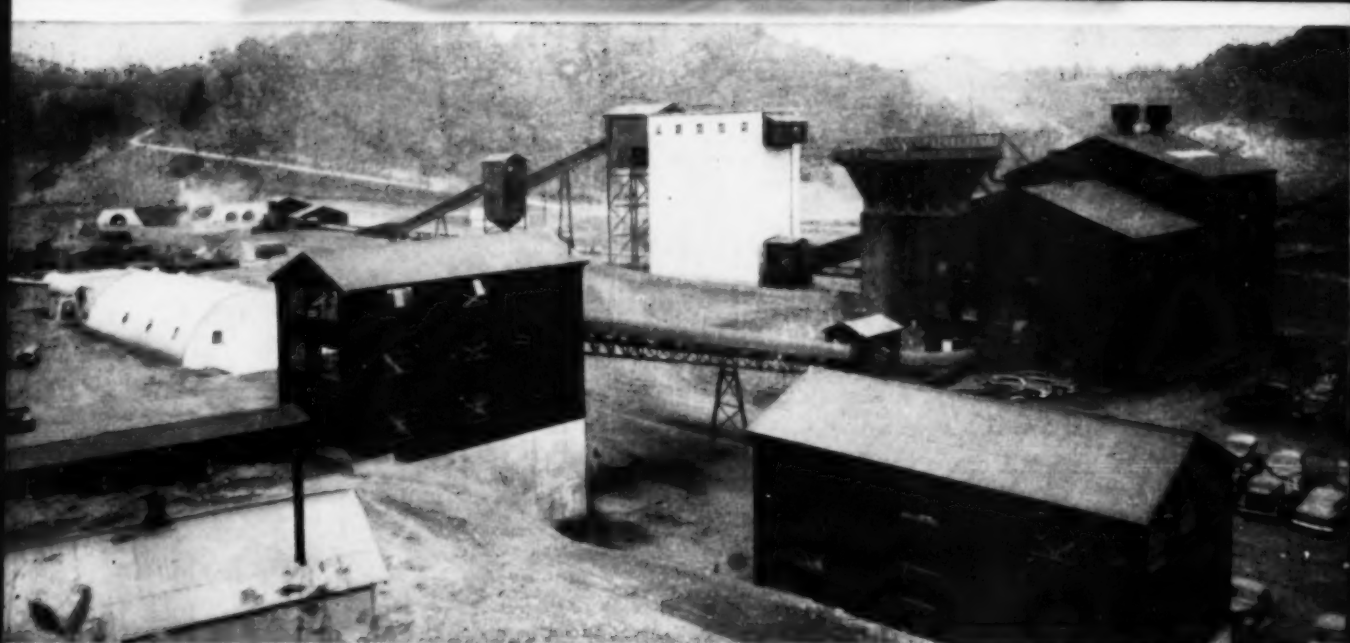
ACCO



AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York,
Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.





Link-Belt engineered throughout—National Mines' transfer house (left center), washery (top right), blending bins (background).

LINK-BELT's total responsibility is your assurance of the best in coal preparation

National Mines gets high-capacity, low cost per ton at Morgantown, W. Va.

TO PRODUCE coal economically from their Morgantown (W. Va.) mine, National Mines Corp. had a dual problem. Not only did they wish to produce a clean metallurgical coal—free of slate, rock and bone—but they also had to move the coal two miles to a river and rail loading station—through rough country—at lowest possible cost per ton.

Link-Belt handled both assignments from start to finish. The new washing and blending plant produces 216 tph of 4" x 0" clean, uniform coal. And the world's longest single belt conveyor carries the coal 10,900 ft. through a tunnel to the river, where Link-Belt also built the barge and rail loading station.

Large or small—Link-Belt accepts total responsibility for complete coal preparation plants. To get all the facts on how this single *proved* source can give you the finest in modern coal preparation—at the lowest over-all cost—call the Link-Belt office near you . . . today.



COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa).

13,025

Here's what LINK-BELT's total responsibility means to you

OVERALL ENGINEERING. Vast experience of nation-wide design and field engineering staff integrates all factors, assures expert planning.

QUALITY EQUIPMENT. Link Belt itself builds a broad line of coal preparation, handling and power transmitting equipment.

COMPLETE ERECTION. Experienced erection superintendents, staffs and skilled crews carry through entire job down to last detail.

SATISFACTORY PERFORMANCE. When you rely on Link-Belt as a single source, Link-Belt accepts responsibility for overall operation.

